DATA BASE MANAGEMENT SYSTEMS

INPUT

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REMOTE COMPUTING SERVICES MARKETS BASED ON DATA BASE MANAGEMENT SYSTEMS

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REMOTE COMPUTING SERVICES
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INPUT

I. INTRODUCTION

I INTRODUCTION

A. SCOPE OF THE STUDY

- This report is the result of a study performed as part of INPUT's Market Analysis Service (MAS).

- The purpose of this study was to describe and evaluate the characteristics of the present and future market for Data Base Management Systems Services (DBMSS).

- The primary focus in this report is on marketing information and analysis, which historically has been in short supply, rather than on technical product descriptions which are readily available from numerous sources.

- This information is designed to assist existing DBMSS vendors, potential DBMSS vendors, and hardware manufacturers to better understand:

    - The requirements and characteristics of DBMSS users and vendors.
    - The characteristics of the most active DBMSS market segments.
    - The different types of product strategies which are most frequently used by DBMSS vendors to achieve market objectives.
    - The rate of growth and direction of the overall market as well as each of the individual segments.

  - The requirements for DBMSS market success.

- Market size forecasts are in current year's dollars, with an annual inflation rate of 5% to 7% included.

B. DEFINITIONS

- A Data Base Management System is a generalized computer program which handles the mechanics of storing, updating and accessing data for multiple applications. This definition does not include file management systems which are designed primarily for single applications (e.g. MARK IV, EASYTRIEVE).

- A Data Base Management System Service is the providing to a user, for a fee, a data base management system through a Remote Computing Service (RCS).

- DBMSS revenues include all revenues directly relating to the processing and storing of data which interacts with the data base management system, as well as programming and training charges related to DBMSS application development and usage. Not included as DBMSS revenues are pull-through revenues, such as processing charges for the use of other software to manipulate data extracted from the data base management system, or revenue obtained from operating a data base management system purchased by one customer and run exclusively for him.

- Remote Computing Services (RCS) revenues are those revenues obtained by the provision of data processing to a user by means of a terminal at the user's site(s). The terminal is connected by a data communications network to the vendor's central computer. Not included as RCS revenues are sales to captive companies (i.e. companies which are part of the same corporate entity as the vendor).

- A Proprietary DBMSS is a DBMSS developed by the RCS vendor or acquired from an external group not actively marketing it as a software product.

- A Third Party DBMSS is a DBMSS developed by someone other than the RCS vendor and marketed by that of another organization as a software product.

- A Proprietary DBMSS Vendor is one which has a majority of its DBMSS revenues from Proprietary DBMSS.

- A Third Party DBMSS Vendor obtains a majority of its DBMSS revenues from Third Party DBMSS.

C. INTERVIEW PROGRAM

- Data for this report was obtained from 48 interviews representing 44 organizations.

- Forty-three of the interviews were conducted by phone, four were in person and one was by mail. These were conducted during March and April 1977.

- Of the 44 organizations interviewed:

  - 20 were DBMSS users.
  - 19 were DBMSS vendors, identified in Exhibit I-1
  - 5 were knowledgeable individuals active in industry groups concerned with data base direction and growth.

EXHIBIT I-1

VENDORS INTERVIEWED

AUTOMATIC DATA PROCESSING

BOEING COMPUTER SERVICES

COMPUTER SCIENCES CORPORATION

COMSHARE

COMPUTER NETWORK CORPORATION

DATANETWORK

GENERAL ELECTRIC-INFO. SERVICES

INTERACTIVE DATA CORPORATION

MARTIN MARIETTA DATA SYSTEMS

McDONNELL DOUGLAS AUTOMATION

NATIONAL CSS

ON-LINE SYSTEMS, INC.

OPTIMUM SYSTEMS, INC.

PRC INFORMATION SCIENCES

RAPIDATA

SERVICE BUREAU COMPANY

SYSTEMS DIMENSIONS, LTD.

TYMSHARE

UNIVERSITY COMPUTING COMPANY

- Of the 41 DBMSS offered by the vendors interviewed, 53% (21) were Proprietary and 47% (20) were Third Party systems.

- Of the 19 vendors interviewed, 63% (12) were classified as Proprietary DBMSS vendors and 37% (7) were Third Party DBMSS vendors.

- Users interviewed were primarily from very large companies. The industries represented were:

    - 7 manufacturers
    - 3 insurance companies
    - 3 state or federal government units
    - 2 utilities
    - 2 national trade associations
    - 2 conglomerates
    - 1 national consulting company

- Inquiries and comments on the information presented in this report are requested from clients.

II. EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. MARKET GROWTH

- The market for Data Base Management Systems Services (DBMSS) is one of the most important and fastest growing segments of the Remote Computing Services Industry. By 1981 over a quarter of RCS revenues will come through DBMSS.

- As shown in Exhibit II-1, the average annual growth rate between 1976 and 1981 for DBMSS will be 36%, with some submarkets growing at faster rates.

- The ability for non-technical (in a data processing sense) people to use DBMSS with minimal help from the vendor will prove to be the major opportunity area for RCS vendors. INPUT projects that the market for DBMSS to non-technical groups in large and very large organizations will grow from under \$70 million per year in 1976 to over \$530 million by 1981. How to achieve market share in this area will be the key to success for many vendors.

- Because of the ways of packaging DBMSS there is high 'Value Added' and profitability potential for vendors in their use.

EXHIBIT II-1

DBMSS MARKET GROWTH BY TYPE OF USER: 1976-1981

DBMSS MARKET SEGMENT	USER EXPENDITURES ($ MILLIONS) 1976	USER EXPENDITURES ($ MILLIONS) 1981	AVERAGE ANNUAL GROWTH RATE	COMMENT
LARGE SCALE SERVICE	19	29	9%	TYPICALLY IMS SERVICE FOR LARGE COMPANIES: INTERIM STEP WHILE SETTING UP IN-HOUSE SERVICE
LARGE USERS-NON-TECHNICAL	67	533	51	END USER DEPARTMENTS WITH LITTLE OR NO DP SKILLS.
LARGE USERS-TECHNICAL	90	242	22	DP SKILLED USERS
SMALL USERS	26	147	41	LESS THAN $20 MILLION ANNUAL SALES.
ON-DEMAND	8	19	19	OVERFLOW AND TEST TIME
TOTAL	210	970	36%	

- The fastest growing of these packaging strategies is the development of Pre-Packaged Applications by vendors using their DBMSS. This market accounts for less than $10 million in 1976, yet will grow to over $240 million in 1981.

- However, the product strategy with the largest share of the DBMSS market in 1981 will be where vendors use DBMSS as 'tools' to provide users with inquiry and analysis capability. This market will be nearly $440 million per year in 1981.

- Major factors in this market growth are:

  - User awareness and demand
  - Trends in hardware/firmware/software (HFS)
  - Vendor emphasis

- Users of in-house computers and processing services are being rapidly educated in the data base management system world by a variety of sources. Both DP and non-DP users are being exposed to a barrage of DBMS promotion from IBM, other major manufacturers, software vendors, and mini-computer manufacturers.

- Of fundamental importance to computer services vendors, users are becoming aware that no one data base management system will satisfy all their requirements. Further, the desire to rapidly implement applications to access and use data bases is spreading through organizations like wildfire. In-house DP departments are finding meeting this demand extremely difficult.

- The improvements in price-performance of processing and storage are reducing the importance of inefficiencies in hardware use when a DBMS is employed.

The ability to more efficiently use design and development staff through using appropriate DBMSs is beginning to outweigh the hardware inefficiencies.

- However, poor performance in standard DBMSs, such as IMS, will be ameliorated by conversion of key code routines into firmware through shifts in the HFS boundaries. Future mainframes will have specialized processor functions for DBMS.
- RCS vendors are strongly emphasizing the use of DBMSS so that potential users are increasingly aware of the acceptability of their method of application development and use.

B. USER CHARACTERISTICS

- DBMSS are primarily being sold to end user departments in large and very large organizations with in-house computers and, very often, in-house DBMS.
- User experience with DBMSS is still relatively short: almost 80% of the users surveyed by INPUT had less than two years of DBMSS experience.
- Average revenues per customer per month were reported by vendors to be \$3,300. Three quarters of the users surveyed paid less than \$5,000 per month, although three respondents spent over \$50,000 per month using Third Party DBMSS.
- Proprietary DBMSS are used almost equally as often for 'Production' applications as for 'Analytical' applications, while Third Party DBMSS are almost invariably used for Production applications. These applications are ranked as 'Critical' or 'Very Important' by 80% of respondents.

- DBMSS are being used for a wide variety of applications although marketing and financial staff functions currently account for about a third of them.

- In selecting a DBMSS, users rank Vendor Service Reliability/Availability as by far the most important criterion. DBMS Features (especially for Third Party DBMSS) and Technical Support were also important.

- Price, Software Portability (even for Third Party DBMSS), and Vendor Applications Experience were of far less import to current users,

- These results reflect the end-user orientation of DBMSS where, often, a DP-trained person has the responsibility to rapidly implement an important application, requiring good service, technical support and system features (including documentation) from the vendor.

C. PRODUCT CHARACTERISTICS AND MARKETING STRATEGIES

- Of the 7 RCS vendors with more than $5 million per year from DBMSS, only MCAUTO uses a Third Party DBMS (IMS). The largest and fastest growing DBMSS are all Proprietary.

- For the 17 DBMSS vendors surveyed, all the Third Party vendors had less than 50 customer sites while 5 of the Proprietary vendors have over 600 customer sites. Thus, Proprietary DBMSS have much wider distribution than Third Party.

- The major change in product characteristics is the move to "Relational" data structures: NOMAD (National CSS) and MAGNUM (Tymshare) are both Proprietary DBMS of this type. Recently, ADABAS and INQUIRE in the Third Party DBMSS have added Relational characteristics.

- Proprietary DBMSS are generally structured to require much less DP skill than Third Party DBMSS. The fastest growing products (FOCUS, MAGNUM, and NOMAD) all require little or no DP skill to operate. IPL (from ADP) and ALADIN (from CSC) are also relatively easy to use.

- Most of the DBMSS available now were introduced in 1974 and 1975. Thus, vendor and user experience is fairly short but long enough to provide the basis for the rapid growth projected.

- The five product marketing strategies that can be employed are, in ascending order of 'Value Added':

    - "Self-Help", where the vendor adopts the commodity approach of putting up a DBMS, usually a Third Party one such as IMS, and inviting a user to 'do it yourself'. Although it has low investment and easy market entry, it has the lowest profit and revenue potential.
    - "Language", where vendors are focusing on customers who intend to do much development work themselves. It requires that the sales force promote the DBMS for development in comparison to FORTRAN or COBOL. It has some attraction, especially for DP-skilled customers.
    - "Tool", where vendors sell on-going analytical and inquiry, rather than development, capabilities. The sales and support people need less product knowledge than for the 'Language' strategy, but need to be far more aware of the applications for which the DBMSS is suited. This strategy will account for almost half the total DBMSS market in 1981.

- "Custom Programming" is the use of the DBMSS and its own programming staff by a vendor to develop and operate an application for a customer. The customer may be totally unaware of the DBMSS used. Although in itself not a main strategy to follow, it is useful as an adjunct and a stepping stone to the highest 'Value Added' strategy.
- "Pre-Packaged Applications" is the strategy which will produce the fastest growth and potentially greatest profitability of all. It embodies the use by vendors of their DBMSS to develop generalized applications programs which are then implemented for individual customers with modifications. The DBMSS enables such an application to be rapidly developed, easily modified, and easily interfaced with other applications.

D. COMPETITIVE ENVIRONMENT

- In DBMSS competition is strong. In almost every sale vendors compete with in-house data processing departments. Competition also comes from other DBMSS, software products and mini-computer vendors.

- Because of lack of coverage and numbers, vendors with Third Party DBMSS compete twice as often with Proprietary vendors as with other Third Party vendors.

- There is very little switching of DBMSS use. Thus, it is very important to achieve first penetration of an account with a DBMSS.

- Tymshare has the most complete range of DBMSS with MAGNUM and FOCUS its main entries: National CSS with NOMAD has been very successful.

- Apart from these two vendors the leading companies and products are:
  - Automatic Data Processing (IPL and System 1022)
  - MCAUTO (IMS)
  - General Electric Information Services (DMS and DMS II)
  - Service Bureau Company (MINI-MIS)
- Several vendors foresee incorporating mini-computers into their network which will use their DBMSS and be able to interact with the system on their central computers.

E. RECOMMENDATIONS

- RCS vendors should implement one or more DBMSS depending on the market segments they select:
  - Production or Analytical applications
  - DP-skilled or non-DP skilled users
  - Size of company
- In any event, an RCS vendor should have at least one DBMSS which it uses to develop applications services.
- Proprietary DBMSS should be the target. Third Party DBMSS should be offered as adjuncts to the product line.
- Vendors should consider selling Proprietary DBMS software as a package for in-house use, thus reducing the portability problem. Prices should be high.

- Vendors should concentrate on selling DBMSS as tools to be operated by non-technical personnel for inquiry and analysis of data.

- DBMSS require more marketing and support than most other RCS products. Availability and training of staff are two keys for success in the market. Users require local support.

- RCS vendors should concentrate on dispersed operations of large and very large companies, especially those without national networks. Staff areas in Finance and Marketing are key targets (as they have been for RCS vendors in the past) but production areas will be increasingly susceptible to penetration.

- Vendors must be careful to conserve their people resources, thus the simpler a DBMSS is to understand and use, the better for users and vendors. A complex, IMS-type product will often take sales and support staff too long to learn. Also, vendors should beware of having too many DBMSS for the same reason.

III. MARKET ANALYSIS

III MARKET ANALYSIS

A. TOTAL MARKET SIZE AND FORECAST

- DBMSS represent a market opportunity that is growing considerably faster than RCS industry's average of 22% per year, as shown in Exhibit III-1.
- As shown in Exhibit III-2, DBMSS revenues will increase as a percentage of total RCS sales from 15% in 1976 to 23% in 1979, and to 26% in 1981.

B. FACTORS AFFECTING GROWTH

- DBMSS will grow at a rapid rate in the future because it has powerful inherent appeals to both users and vendors.
- DBMSS services are attractive to users because:
    - Important custom applications can often be developed faster and at less cost than by traditional programming methods.
    - Inquiry reporting and updating activities can often be done by non-DP trained personnel.
    - Large amounts of data can be analyzed in ways meaningful to operational and strategic decision making.

EXHIBIT III-1

DBMSS REVENUE GROWTH: 1976-1981

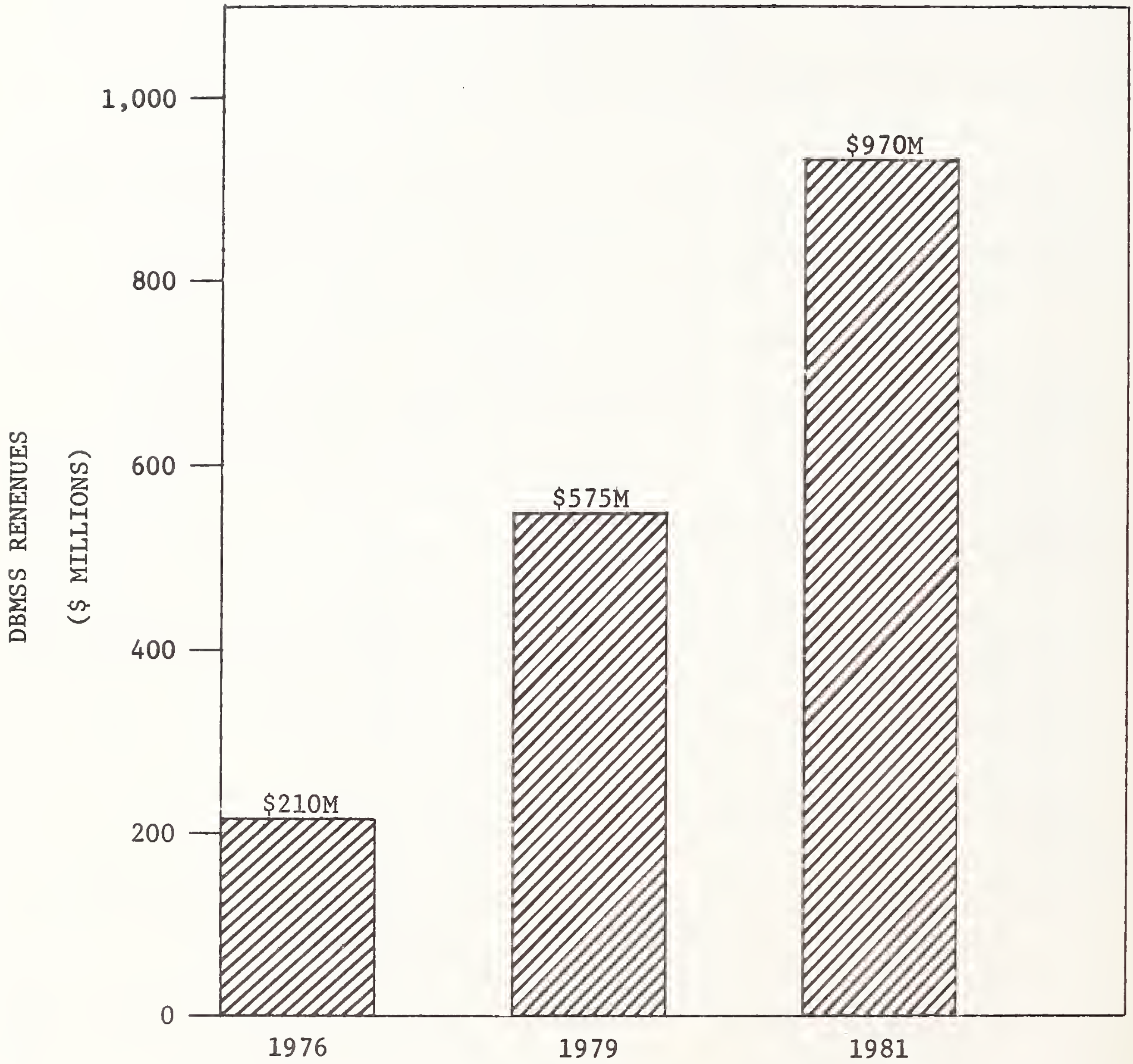
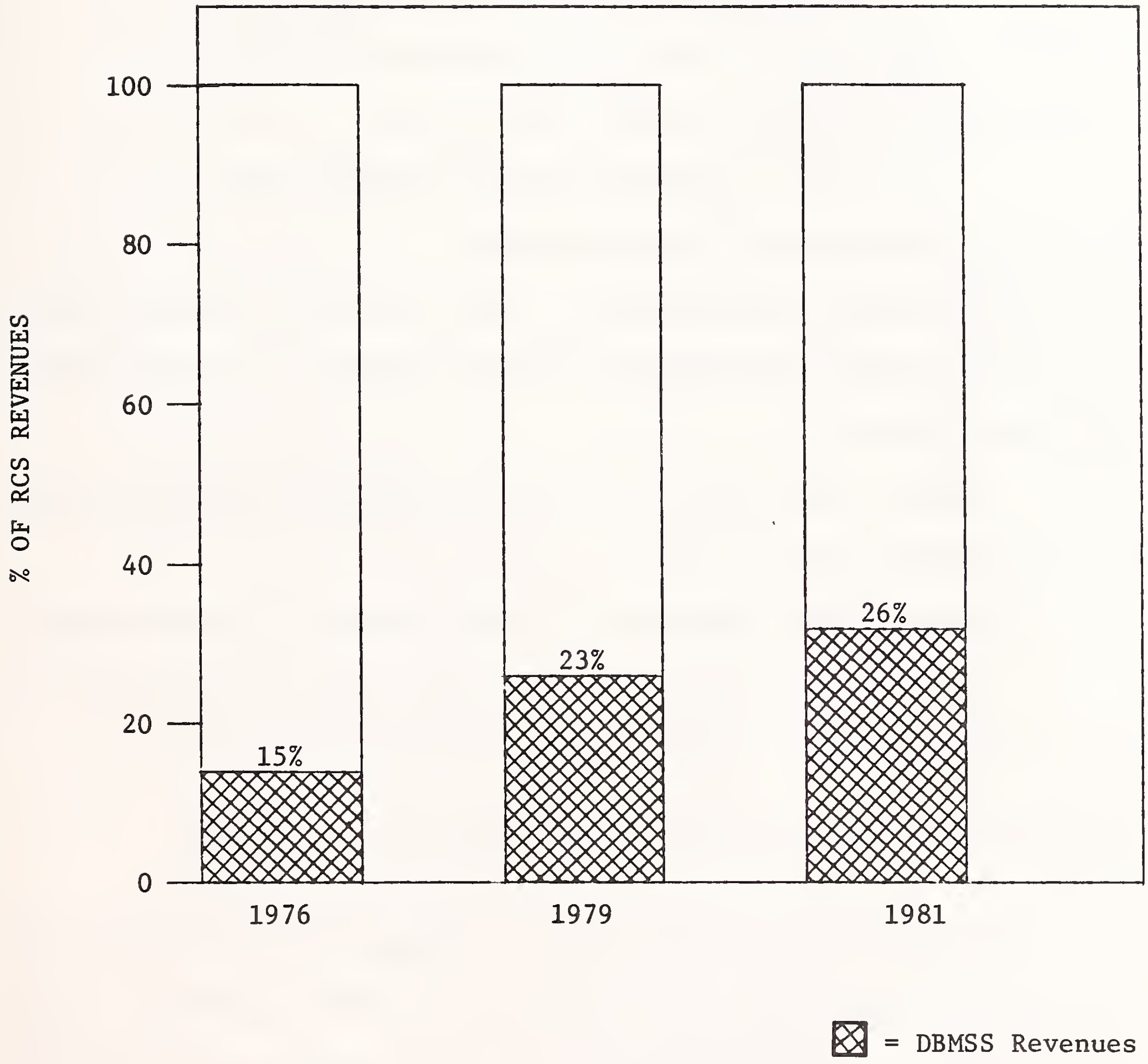


EXHIBIT III-2

DBMSS REVENUES AS

A PROPORTION OF

RCS REVENUES: 1976-1981



  - DBMSS brings "state-of-the-art" techniques directly to the user.

- DBMSS is appealing to vendors because it can be marketed to a number of different, but broad, overlapping markets.

  - For example, depending upon the market segment(s) chosen, DBMSS can be attractive to:
    - Large, medium or small sized organizations.
    - Those with in-house computers and those without.
    - Practically any industry in the country.
    - Any major functional area within an organization.
    - DP and non-DP trained personnel.
  - DBMSS offers the opportunity for a steady, predictable revenue stream of from $100 to $200,000 per month per customer, plus additional add-on revenue.
  - Customers, once acquired, are not prone to leave the vendor providing reasonable service is given.
  - The same DBMSS technology, if carefully chosen, can also be leveraged to build vendor-proprietary, pre-packaged applications, as well as serving as a tool for fast, custom application development.

- Other important factors affecting DBMSS revenue growth include:

  - The increasing awareness by the user that application development, not hardware capacity, is the bottleneck to additional computer usage. DBMSS is becoming recognized as a way to implement important applications faster and with less requirement for scarce DP technicians.

- Increasing data base sophistication of the users. Users are discovering that a single data base management system is not suitable for all types of problem solving. In addition, there is increasing awareness of the difficulties and complexities of operating such systems in-house.
- The shortage of DBMSS trained sales and support personnel. Vendors cite this as one of their most severe problems in the DBMSS marketplace. Thus, it slows down potential growth.
- The versatility of DBMSS technology. All four modes of Processing Services (i.e. Utility, General Business, Specialty Applications, and Scientific and Engineering) can use DBMSS.
- The success of software products vendors selling data base management systems for in-house use. Although these vendors often represent competition in the short term, they educate the user on the advantages of "going data base" and thus help to stimulate demand within a user company that frequently the in-house system cannot satisfy.
- The appeal of many DBMSS to the non-DP users of whom there are many times more individuals in an organization than those who are DP-skilled.
- The acknowledgement by IBM and other major hardware vendors that "data base" is the technology which is greatly influencing the characteristics of the next generation of machines.
- The marketing emphasis on data base by mini-computer manufacturers. While they often represent competition to DBMSS vendors, the market is so vast that mini-computer vendors help to increase the size of the overall market by making potential users more aware of their appeal.

- The strongly held belief by many leading RCS vendors that DBMSS is the wave of the future. Because of this convistion, vendors are investing significant amounts of money in marketing, product enhancements, technical support, training, and documentation.

C. MARKET SEGMENTS

- Market segments are groups of customers which have common needs.

- Each segment requires different types of products, services and support from DBMSS vendors.

- It is very important for a vendor to identify which market segment(s) it is best equipped to serve. A well-financed, superior DBMSS product and staff can fail if the marketing strategy is directed to the wrong market segment.

- Market segments are defined in terms of:

  - Who is buying (Customer Characteristics)
  - What they are buying (Product Position)
  - What the benefits are they expect to receive (Purchasing Rationale)
  - Who is selling (Vendor Characteristics)

- The eight major DBMSS market segments most frequently indentified during INPUT's survey of DBMSS users and vendors were:

  A: "LARGE SCALE SERVICE"

  B1: "NON-TECHNICAL USERS (PRODUCTION) WITH LARGE DP IN-HOUSE"

  B2: "NON-TECHNICAL USERS (ANALYTICAL) WITH LARGE DP IN-HOUSE"

C1: "TECHNICAL USERS WITH LARGE DP OFF-SITE"

C2: "TECHNICAL USERS WITH LARGE DP ON-SITE"

D1: "TECHNICAL USERS IN SMALL COMPANIES WITH ON-SITE DP"

D2: "NON-TECHNICAL USERS IN SMALL COMPANIES WITHOUT ON-SITE DP"

E: "ON DEMAND PROCESSING"

- Customers in these segments range in size from small companies of less than $10 million annual sales to large divisions of multi-billion dollar corporations.

- Each market segment is discussed below in terms of its customer characteristics, 'products' and benefits sought, vendors active, market growth, and causes.

- In assessing 'products sought', several ways of using DBMSS are identified. These are discussed in detail in Chapter VI under Product Strategies:

  - LANGUAGE, when a user intends to primarily do development work using the DBMSS.
  - TOOL, when a user is primarily concerned with performing inquiry and analysis when the system is operating rather than the development itself.
  - CUSTOM PROGRAMMING, when the user is looking for a solution provided by the vendor developing a custom application with the DBMSS.
  - PRE-PACKAGED APPLICATIONS, when the vendor uses the DBMSS to develop applications packages for general use through the RCS.

- The following exhibits summarize and illustrate points in the text relating to market segments:

  - Exhibit III-3: Market Segment Revenue Growth 1976-1981
  - Exhibit III-4: Market Share Forecasts 1976-1981
  - Exhibit III-5: Market Segment Growth Comparisons 1976-1981
  - Exhibit III-6: Market Segment Share and Revenue Changes 1976-1981

1. SEGMENT A: "LARGE SCALE SERVICE"

a. Customer Characteristics

- This segment involves large, long-term DBMSS contracts of from $50,000 to $200,000 per month, as shown in Exhibit III-7.

- These contracts are significantly larger than any other segment.

- Services are frequently for on-line production processing of applications which are at the heart of the customer's business operations.

- The vendor supplies a major portion of the organization's total DP resources.

- Customers are usually very large organizations (annual sales in excess of $300 million) which are growing rapidly. They frequently have large in-house DP centers which, in spite of their size, cannot serve the company's total needs.

- Typical applications are order entry and material control.

- Most of these customers plan to seriously consider bringing DBMSS processing in-house at the expiration of the long-term contract. For this reason, they usually demand a DBMSS with portability.

EXHIBIT III-3

DBMSS MARKET SEGMENT REVENUE GROWTH: 1976-1981

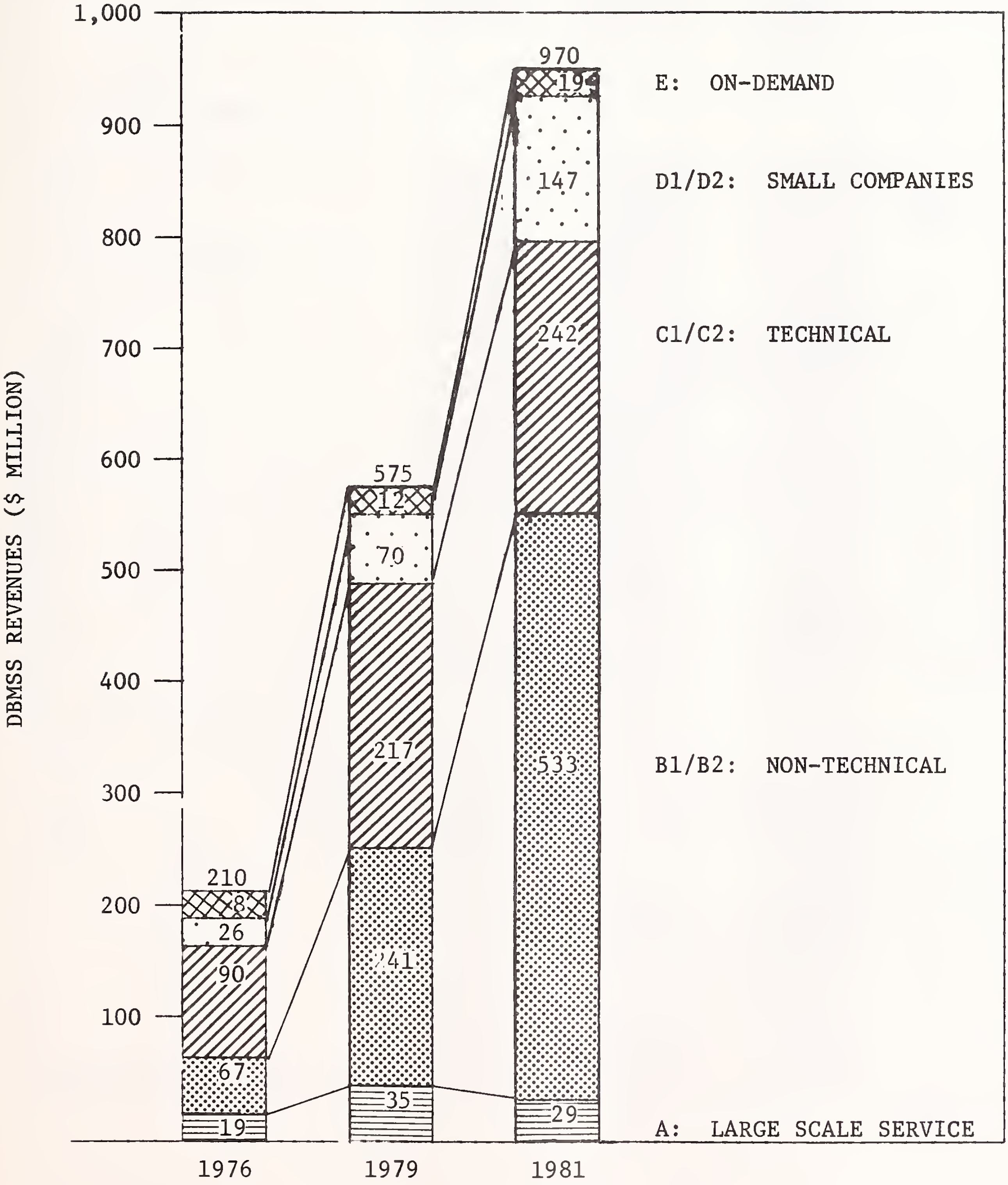


EXHIBIT III-4

DBMSS MARKET SHARE FORECASTS: 1976-1981

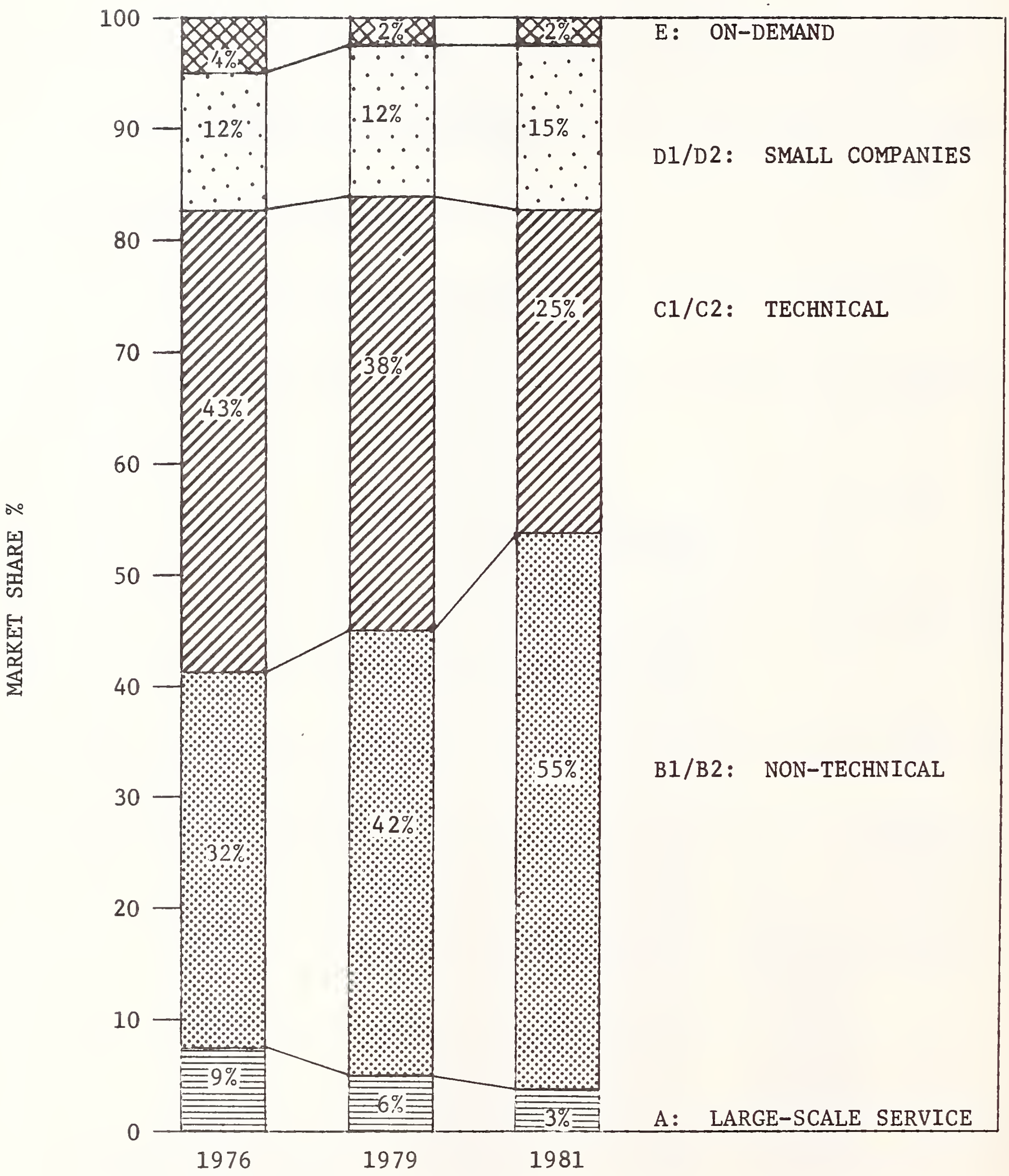


EXHIBIT III-5

DBMSS MARKET SEGMENT GROWTH COMPARISONS: 1976-1981

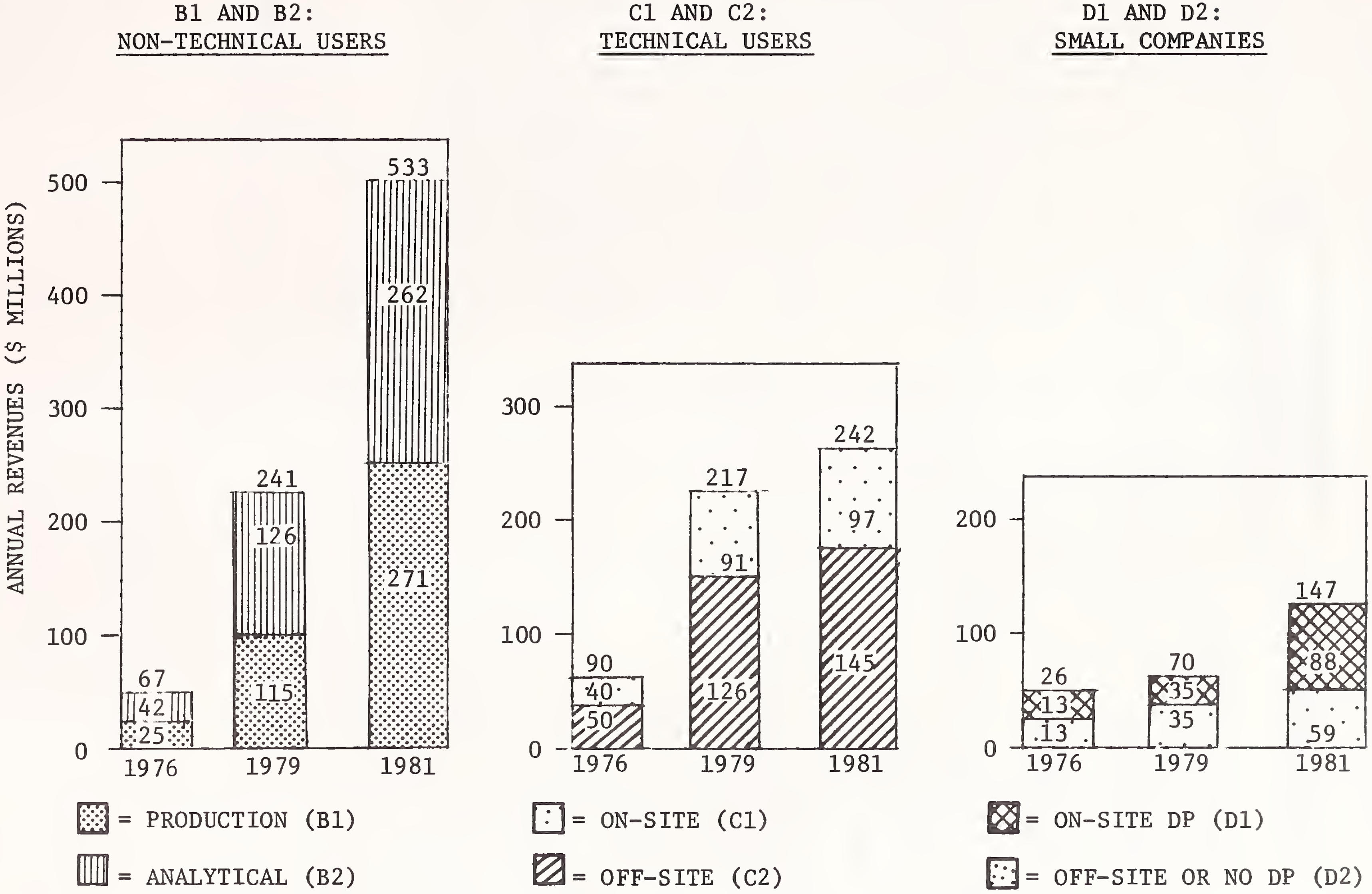


EXHIBIT III-6

DBMSS MARKET SEGMENT SHARE AND REVENUE CHANGES: 1976-1981

MARKET SEGMENT	REVENUES ($ MILLIONS)			AAGR* 1976-			
	1976	1979	1981	1981	1976	1979	1981
A LARGE-SCALE SERVICE	19	35	29	9	9%	6%	3%
B1 NON-TECHNICAL (PRODUCTION)	25	115	271	61	12	20	28
B2 NON-TECHNICAL (ANALYTICAL)	42	126	262	44	20	22	27
TOTAL NON-TECH. (B1 & B2)	67	241	533	51	32	42	55
C1 TECH./OFF-SITE	50	126	145	24	24	22	15
C2 TECH./ON-SITE	40	91	97	19	19	16	10
TOTAL TECH. (C1 & C2)	90	217	242	22	43	38	25
D1 SMALL CO./TECH./ ON-SITE DP	13	35	59	35	6	6	6
D2 SMALL CO./NON-TECHNICAL	13	35	88	47	6	6	9
TOTAL SMALL CO.	26	70	147	41	12	12	15
E ON DEMAND PROCESSING	8	12	19	19	4	2	2
TOTAL DBMSS SEGMENTS	210	575	970	36	100%	100%	100%
TOTAL RCS REVENUES	1,400	2,542	3,800	22%			
DBMSS AS % OF RCS	15%	23%	26%				

*AAGR = AVERAGE ANNUAL GROWTH RATE

EXHIBIT III- 7

MARKET SEGMENT SUMMARY:

LARGE SCALE SERVICE

CUSTOMER CHARACTERISTICS	MARKET SEGMENT A. LARGE SCALE SERVICE
COMPANY SIZE (ANNUAL SALES)	VERY LARGE (OVER $300 MILLION)
APPLICATION TYPE	ON-LINE PRODUCTION
USER DP EXPERIENCE	EXTENSIVE
DP RESOURCES	LARGE DP IN-HOUSE
PORTABILITY REQUIREMENTS	DESIRE PORTABILITY
TYPICAL MONTHLY DBMSS EXPENDITURES	$50K - $200K
MAIN PRODUCTS SOUGHT	LANGUAGE TOOL MACHINE AVAILABILITY PRE-PACKAGED APPLICATION
IMPORTANT VENDOR ATTRIBUTES	HEAVY DBMSS EXPERTISE MUCH SUPPORT
MAIN BENEFITS DESIRED	SPEED POWER FLEXIBILITY
VENDOR EXAMPLE	McDONNELL DOUGLAS AUTOMATION
VENDOR DBMSS EXAMPLE	IMS
VENDOR DBMSS TYPE	PROPRIETARY

b. Products and Benefits Sought

- Customers in this segment buy a combination package which is comprised primarily of large quantities of vendor expertise and support, a DBMSS language, tools, and pre-packaged applications for use by DP trained personnel in appliication develpment, maintenance, inquiry and analysis, as well as large volumes of vendor processing.

- Primary benefits sought include speed, power, and flexibility of application development, installation and maintenance, as well as power and flexibility of subsequent inquiry and analysis.

c. Vendors and Growth Trends

- McDonnell Douglas Automation is a leading vendor in this segment with their IMS services.

- This segment is one of the smallest in terms of total revenues which will increase from $19 million in 1976 to $35 million in 1979, and will decline to $29 million by 1981.

d. Factors Affecting Market Growth

- Large-Scale Service is a specialty service.

  - A vendor must have some very unique capabilities, including an unquestioned reputation for data base technical expertise, large amounts of machine capacity, significant staff support resources, and the financial ability to accommodate both the conversion to its service and the eventual withdrawal from it.

  - Few vendors can meet these requirements, and few seem interested in a market with such a high dependency upon a small number of customers.

- Fourth generation hardware will be very appealing to this segment for in-house use. The data base efficient, fourth generation computers will provide big incentives for the existing Large-Scale Service user to move in-house, and for the prospective user to avoid the service entirely.

2. SEGMENT BI: "NON-TECHNICAL USERS (PRODUCTION) WITH LARGE DP IN-HOUSE"

a. Customer Characteristics

- DBMSS revenues per customer usually range from $1,000 to $20,000 per month, as shown in Exhibit III-8.

- Most customers have annual sales in excess of $100 million.

- Production oriented DBMSS applications are bought for use in functional areas which are important to the customer's business.

- Examples of applications used by customers surveyed in this segment include; production control for a manufacturing organization (revenue = $2,000 per month), insurance claims processing for a small but important line of a major insurance company (revenue = $2,000 per month), and a construction budget system for a large utility (revenue = $3,000 per month).

- User departments have little DP experience.

- The customer's liaison person to the DBMSS vendor usually has little or no DP experience.

EXHIBIT III-8

MARKET SEGMENT SUMMARY:

NON-TECHNICAL USER/LARGE DP IN-HOUSE

CUSTOMER CHARACTERISTICS	MARKET SEGMENTS B1 NON-TECHNICAL (PRODUCTION)/ LARGE DP IN-HOUSE	 B2 NON-TECHNICAL (ANALYTICAL)/ LARGE DP IN-HOUSE
COMPANY SIZE (ANNUAL SALES)	PRIMARILY, LARGE AND VERY LARGE (OVER $100 MILLION)	PRIMARILY, LARGE AND VERY LARGE (OVER $100 MILLION)
APPLICATION TYPE	PRODUCTION	ANALYSIS
USER DP EXPERIENCE	LITTLE TO NONE	LITTLE TO NONE
DP RESOURCES	LARGE DP IN-HOUSE	LARGE DP IN-HOUSE
PORTABILITY REQUIREMENTS	NOT IMPORTANT	NOT IMPORTANT
TYPICAL MONTHLY DBMSS EXPENDITURES	$1K - $20K	$1K - $10K
MAIN PRODUCTS SOUGHT	LANGUAGE TOOL PRE-PACKAGED APPLICATION	LANGUAGE TOOL PRE-PACKAGED APPLICATION
IMPORTANT VENDOR ATTRIBUTES	SUPPORT GOOD CUSTOMER TRAINING	SUPPORT GOOD CUSTOMER TRAINING
MAIN BENEFITS DESIRED	EASE OF USE FAST DEVELOPMENT EASY MAINTENANCE	EASE OF USE FAST DEVELOPMENT EASY MAINTENANCE
VENDOR EXAMPLE	TYMSHARE	NATIONAL CSS
VENDOR DBMSS EXAMPLE	MAGNUM	NOMAD
VENDOR DBMSS TYPE	PROPIETARY	PROPRIETARY

- Portability of the DBMSS is not a big concern to the buyer in spite of the existence of a good sized DP center in-house. This is due to the buyer's primary interest in ease of use by non-DP personnel, an attribute which currently is more pronounced in Proprietary than in Third Party DBMSS. In some cases the buyer liked the lack of portability because it will help delay the later transfer of this system to in-house DP control.

b. Products and Benefits Sought

- Buyers in this segment most frequently buy a solution to a problem with emphasis on DBMSS as a Language, Tool, and/or Pre-Packaged Application by which non-DP oriented people can perform fast development, easy maintenance, inquiry and analysis.

- Frequently, customers want the vendor to program the first application and then be trained so that they can do subsequent programming and maintenance.

c. Active Vendors

- Active vendors include Automatic Data Processing (IPL) and Tymshare (MAGNUM).

3. SEGMENT B2: "NON-TECHNICAL USERS (ANALYTICAL) WITH LARGE DP IN-HOUSE"

a. Customer Characteristics

- This segment is very similar to Segment B1 in terms of company size (over $100 million), non-DP user experience, presence of a large in-house DP center and lack of concern with DBMSS portability.

- Differences between B1 and B2 are primarily in revenue size and type of application processed. A big revenue customer for the production-oriented B1 group would spend up to $20,000 per month, while a big customer in the B2 group rarely exceeds $10,000 per month.

- The most important difference between this segment and B1 is that the applications are analytically oriented rather than production (transaction) based. This is a crucial distinction from a marketeer's point of view since analytical applications are:

  - Best processed using data base management systems with capabilities different from those applied to production systems.
  - Frequently project oriented and thus represent a more volatile revenue stream.
  - Usually sold to headquarters staff groups rather than line departments.

- Examples of analytical applications found within this market segment include; tracking of investment tax credits by a staff group of a major midwest utility (revenue = $3,000 per month), market analysis and forecasting by a medium-size durable goods manufacturer using a data base updated with information obtained from an in-house DP system (revenue = $1,000 per month), and financial analysis and DP project tracking by a headquarters staff group of a $200 million services company, using a data base updated from in-house generated computer tapes.

b. Products and Benefits Sought

- Like Segment B1, customers buy solutions which employ a DBMSS language, tool, and pre-packaged applications for use by non-DP trained people. They seek fast program development and DP technology-free inquiry, analysis and maintenance. While the vendor may program initial applications, the buyer's intent is to eventually do applications development himself.

c. Active Vendors

- Many vendors are active in this marketplace, including Automatic Data Processing (IPL), General Electric-Information Services (DMS), National CSS (NOMAD), and Tymshare (FOCUS).

4. GROWTH DIRECTIONS OF "NON-TECHNICAL USER" SEGMENTS (B1 and B2)

a. Growth Trends and Causes

- As shown in Exhibit III-3 through 6, while all DBMSS market segments will show revenue increases during the 1976-1981 period, by far the largest increase will take place in the B1 and B2 Non-Technical User segment.

- Key factors which will influence this dramatic growth include:

    - The size of the prospective user base. Potential Non-Technical Users represent by far the largest group of all possible DBMSS users,outnumbering DP-trained individuals at least 10 to 1.
    - Increased awareness of computer benefits. These Non-Technical Users are increasingly becoming exposed in school and on-the-job to data processing payoffs. As they move up into decision-making positions, they are aggressive in pushing for DP applications.
    - Availability of new Non-Technical user oriented DBMSS. Many of the most popular DBMSS of this type have been on the market for less than two years, yet have been extremely well receive. This market interest

will continue to stimulate vendors to invest in Systems for Non-Technical Users. .

- High cost and scarcity of technology oriented personnel. An IBM user survey published two years ago indicated that, on the average, the larger DP shops had a three-year backlog of applications development projects. DP trained people will continue to be in short supply.

b. "Production" (B1) versus "Analytical" (B2) Segments

- As shown previously in Exhibit III-5, analytical applications accounted for 68% more revenues than production systems ($42 million versus $25 million) in 1976.

- However, by 1979, production applications will almost equal analytical systems ($115 million to $126 million) and by 1981 will surpass them ($271 million to $262 million).

- Vendors are becoming increasingly interested in production systems because they generally bring steadier revenue, are processed more frequently, and are less dependent upon the interests of one or two staff people who may transfer to other jobs, leaving the system in limbo.

- Production applications are generally of more interest to management decision-makers since it is viewed more as a "line" operations system and thus easier to justify than a "staff" overhead application.

c. Company Size

- Large and very large companies will continue to be the main components of the Non-Technical User market segments through 1971. However, the size of the average customer in these segments will decrease somewhat as data base awareness become more widespread among medium and small sized companies.

5. SEGMENT C1: "TECHNICAL USERS WITH LARGE DP OFF-SITE"

a. Customer Characteristics

- Customer DBMSS revenues from this segment average $1,000 to $5,000 per month, as shown in Exhibit III-9.
- Like Segments B1 and B2, total sales of the companies buying this type of DBMSS are usually in excess of $100 million.
- However, Segment C1 differs significantly from B1 and B2 in that buyers and users generally have much DP experience, have no in-house DP alernative to consider and demand DBMSS portability.
- Applications processed by customers in this segment tend to be more analytical than production oriented, although both are present. The applications themselves are similar to those found in Segments B1 and B2 (e.g. tracking, data base analysis, budget/project reporting).
- In contrast to segments B1 and B2, revenues per customer rarely exceed $5,000 per month.
- Companies in Segments B1, B2 and C1 are all large (i.e. greater than $100 million sales), have the same DBMSS applications needs, and yet view DBMSS portability in opposite ways. Segment C1 buyers demand portability while B1 and B2 users show much less concern with this issue.

EXHIBIT III-9

MARKET SEGMENT SUMMARY

TECHNICAL USER/LARGE DP

CUSTOMER CHARATERISTICS	MARKET SEGMENTS	
	C1 TECHNICAL LARGE DP OFF-SITE	C2 TECHNICAL LARGE DP ON-SITE
COMPANY SIZE (ANNUAL SALES)	LARGE (OVER $100 MILLION)	LARGE (OVER $100 MILLION)
APPLICATION TYPE	PRODUCTION ANALYSIS	PRODUCTION ANALYSIS
USER DP EXPERIENCE	EXTENSIVE	EXTENSIVE
DP RESOURCES	NO DP IN-HOUSE	MEDIUM TO LARGE DP IN-HOUSE
PORTABILITY REQUIREMENTS	DESIRE PORTABILITY	DESIRE PORTABILITY
TYPICAL MONTHLY DBMSS EXPENDITURES	$1K - $5K	$1K - $5K
MAIN PRODUCTS SOUGHT	LANGUAGE TOOL	LANGUAGE TOOL
IMPORTANT VENDOR ATTRIBUTES	LOCAL SUPPORT DBMSS EXPERTISE	LOCAL SUPPORT DBMSS EXPERTISE
MAIN BENEFITS DESIRED	SPEED POWER FLEXIBILITY	SPEED POWER FLEXIBILITY
VENDOR EXAMPLE	SYSTEMS DIMENSIONS, LTD.	OPTIMUM SYSTEMS, INC.
VENDOR DBMSS EXAMPLE	IDMS	IMS
VENDOR DBMSS TYPE	THIRD PARTY	THIRD PARTY

- At first glance, Segment CI's user attitude seems surprising since they have no internal DP operation lobbying for eventual control of the application.

- Segment CI's user position can be partially explained, however, by recognizing that the buyers and users tend to have a heavier technical DP orientation and thus have more awareness of, and concern about, incompatability problems than Segment B1/B2 users.

- In addition, Segment CI buyers, because they have no internal DP resources, often have had more total experience with outside RCS vendors and may perhaps be more cautious (rightly or wrongly) with external suppliers.

- Another factor contributing to Segment CI's user concern with portability is that federal government agencies are found more frequently in this segment than in others. They have the strongest concern over standardization and compatability of practically any other large group of DP users.

b. Products and Benefits Sought

- Because users are very heavily DP oriented, they are most attracted to DBMSS as a language for application development and as a tool for inquiry and analysis. They want power and flexibility from their DBMSS, even at the expense of ease of use by non-DP people. Speed of use is also an important attribute to them as they like to quickly set up programs to access and analyze data bases.
- In most cases, CI buyers select the Third Party data base management system first, and then look around for a DBMSS vendor which offers it as a service.

c. Active Vendors

- Active DBMSS vendors in this market segment include Boeing Computer Services (IDMS, System 2000, INQUIRE), Computer Sciences (ALADIN), Optimum Systems, Incorporated (IMS), and Systems Dimensions Limited (IDMS, System 2000, IMS). All of these vendors derive an important part of their revenues from government clients.

6. SEGMENT C2: "TECHNICAL USERS WITH LARGE DP ON-SITE"

a. Customer Characteristics

- This segment is quite similar to Segment C1, as shown in Exhibit III-9.

- Unlike C1, however, C2 has its own large scale, in-house DP resources at its location.

- C2 has similar characteristics to B1 and B2 (large company, large DP) except C2 involves DP experienced users and B1 and B2 have non-DP trained users. DBMSS vendors rarely serve both types of users in the same company unless they are in two very distant divisions or subsidiaries.

- The reason for the C2 user's insistance upon portability may well be more due to his lack of familiarity with Proprietary systems rather than to a fear of incompatibility.

b. Products and Benefits Sought

- Like Segment C1, C2 users have much DP experience and look upon DBMSS as a DP trained user's language for applications development, and as a tool for inquiry and analysis. Power, flexibility and speed of use are most important.

- C2 buyers are much more likely to delve into detailed technical comparisons of data base system attributes and make a final decision more from a technical than a "solution" point of view.

c. Active Vendors

- Vendors active in this segment are generally the same ones that are active in C1, e.g. Boeing Computer Services (IDMS, System 2000, INQUIRE), Computer Sciences (ALADIN), Optimum Systems (IMS), and Systems Dimensions Limited (IDMS, System 2000, IMS).

7. GROWTH DIRECTIONS OF "TECHNICAL USER" SEGMENTS (C1 AND C2)

a. Growth Trends and Causes

- In 1976, these two segments combined constitute the largest group with $90 million revenues and a 43% market share. Although by 1979 revenues will be $217 million and by 1981 will be $242 million, market share will slip to 38% by 1979 and to 25% by 1981.

- As shown in Exhbit III-3, by 1979 the B1 and B2 Non-Technical User segments will surpass the revenues of the C1 and C2 Technical User segments ($241 million to $217 million). By 1981, sales will be more than twice as much.

- The main factors influencing the gowth of the C1 and C2 Technical User segments are:

  - The increasing awareness of data base advantages by DP-trained personnel. Since these individuals are the primary target for data base software products vendors, they are the first to be educated and the first to personally experience the potential of this new technology.

- Pressure from management to build more flexible systems faster and with better reliability. Management, which is paying the ever increasing costs of data processing, is now demanding more tangible results from that investment. Technicians are feeling the heat and are now more open to productivity tools and aids.
- The introduction of new hardware in the 1978-80 time frame. This factor will have a temporary negative impact on growth since technicians will be preoccupied with evaluation of the new hardware and then with conversion. However, since it will be designed specifically to accommodate large data base processing, this new technology will also stimulate interest in DBMSS.

b. "Off-Site DP" (C1) versus "On-Site DP" (C2)

- As shown in Exhibit III-5, Off-Site users will continue to comprise a slightly larger portion of the revenues than On-Site (C2) users throughout the next five years.

- This is primarily because:

  - Companies with off-site DP have historically been an important market for RCS vendors.
  - Technically oriented users with on-site DP are often more influenced by the internal DP staff concerns and desires, which is usually not pro-DBMSS.

8. SEGMENT DI: "TECHNICAL USERS IN SMALL COMPANIES WITH ON-SITE DP"

a. Customer Characteristics

- Revenues per customer are usually less than $2,000 per month and come from companies with total sales of less than $20 million, as shown in Exhibit III-10.
- Customers in this segment have small in-house DP.
- Both production and analytical DBMSS applications are processed.
- This is the only segment analyzed where most users are usually members of the in-house DP department. They therefore have DP experience, although it is confined to relatively small computers.
- They have some awareness of data base management systems, but not a great deal.
- They have some concern as regards DBMSS portability, but not to the degree seen in other market segments.
- An example of a typical customer would be an organization with an in-house IBM Model 360/40, but which does special accounting and financial analysis using a Third Party DBMSS.

b. Products and Benefits Sought

- Users are seeking a solution to a particular problem. However, they are also interested in the system behind the solution. They want a language and a tool which has power and flexibility for DP users.

EXHIBIT III-10

MARKET SEGMENT SUMMARY

SMALL COMPANY USERS

CUSTOMER CHARACTERISTICS	MARKET SEGMENTS D1 TECHNICAL/ SMALL COMPANY/DP ON-SITE	 D2 NON-TECHNICAL/ SMALL COMPANY/NO ON-SITE DP
COMPANY SIZE (ANNUAL SALES)	MEDIUM AND SMALL (LESS THAN $20 MILLION)	SMALL (LESS THAN $10 MILLION)
APPLICATION TYPE	PRODUCTION ANALYSIS	PRODUCTION ANALYSIS
USER DP EXPERIENCE	SOME TO NONE	SOME TO NONE
DP RESOURCES	SMALL DP IN-HOUSE	NO DP IN-HOUSE
PORTABILITY REQUIREMENTS	SOME WANT PORTABILITY	NOT IMPORTANT
TYPICAL MONTHLY DBMSS EXPENDITURES	UNDER $2K	UNDER $1K
MAIN PRODUCTS SOUGHT	SOLUTIONS LANGUAGE TOOL	SOLUTIONS CUSTOM PROGRAMMING
IMPORTANT VENDOR ATTRIBUTES	SUPPORT GOOD CUSTOMER TRAINING	VENDOR DOES PROGRAMMING
MAIN BENEFITS DESIRED	SPEED POWER FLEXIBILITY	INEXPENSIVE DEVELOPMENT EASE OF USE
VENDOR EXAMPLE	PRC INFORMATION SCIENCES	AUTOMATIC DATA PROCESSING
VENDOR DBMSS EXAMPLE	ADABAS	IPL
VENDOR DBMSS TYPE	THIRD PARTY	PROPRIETARY

- Users seek a DBMSS for applications development, inquiry and analysis.

c. Active Vendors

- Vendors placing emphasis on this marketplace include PRC Computer Centers, Inc. (ADABAS), and Systems Dimensions Limited (IDMS, System 2000).

9. MARKET SEGMENT D2: "NON-TECHNICAL USERS IN SMALL COMPANIES WITHOUT ON-SITE DP"

a. Customer Characteristics

- This market segment provides DBMSS vendors with an average revenue of $500 to $1,000 per customer per month.

- It is comprised of small organizations (less than $20 million sales) with no internal DP, and usually no individuals with DP experience.

- Both production and analytical applications are implemented, usually with no concern about DBMSS portability.

- Customer examples: a small manufacturer performing inventory control reporting and anlalysis (revenue = $1,000 per month), and a trade association doing membership accounting and analysis (revenue = $500 per month).

b. Products and Benefits Sought

- Buyers are seeking solutions and have little understanding, or even awareness of the DBMSS behind that solution. They are seeking inexpensive development and ease of use by non-DP personnel. Generally, they want the vendor to do the initial programming.

c. Active Vendors

- Vendors active in this segment include Automatic Data Processing (IPL), and Computer Sciences Corporation (ALADIN).

10. GROWTH DIRECTIONS OF "SMALL COMPANY" USER SEGMENTS (D1 and D2)

a. Overall Trends and Causes

- These two segments will increase their market share from 12% and 15% from 1976 to 1981.
- By 1981, revenues will be $147 million, up from $26 million in 1976.
- They will account for more dollar revenue by 1979 ($70 million) than that enjoyed by Non-Technical Users (B1 and B2) in 1976 ($67 million).
- Causes of this growth pattern include:
  - Smaller companies have not been the RCS vendor's main focus. Presently constituting only 15% of all RCS revenues, INPUT forecasts that the small companies will comprise 18% of all RCS sales by 1981.
  - Increased DBMSS awareness stimulated by mini-computer vendor emphasis on data base. Many aggressively competing mini-computer vendors are educating the small user in data processing and are advocating data base management systems as the way to cut down programming costs and increase accessibility to needed data.

- The smaller company requires a great deal of training and support, yet provides much less average revenues per customer than the larger organization. Thus, many vendors prefer to leave it alone.
- Less DBMSS competition. Many vendors feel small companies, however, have a real need for DBMSS and are underserved by RCS vendors. As a result they intend to devote significant resources to marketing to these segments, thus stimulating additional demand.

b. Technical (D1) Versus Non-Technical (D2) User Growth

- As shown in Exhibit III-5, the revenues of the D1 an D2 segments will be similar through 1979.
- However, by 1981, the Non-Technical Segment (D2) will account for 49% more revenues than the Technical (D1) market ($88 million versus $59 million).

11. SEGMENT E: "ON DEMAND PROCESSING"

a. Customer Characteristics

- Customers are generally large organizations (over $100 million) either running a Third Party data base management system on large in-house hardware, or else seriously considering the possibility, as shown in Exhibit III-11.
- Users are seeking test time due to inadequate internal machine capacity, or tempory lack of internal expertise.
- Revenue is highly variable, both within and between customers, and ranges from less than $1,000 to more than $100,000 monthly.

EXHIBIT III-11

MARKET SEGMENT SUMMARY

ON-DEMAND PROCESSING

CUSTOMER CHARACTERISTICS	MARKET SEGMENTS E ON-DEMAND PROCESSING
COMPANY SIZE (ANNUAL SALES)	LARGE AND VERY LARGE (OVER $100 MILLION)
APPLICATION TYPE	TESTING, PRODUCTION, ANALYSIS
USER DP EXPERIENCE	EXTENSIVE
DP RESOURCES	LARGE DP IN-HOUSE
PORTABILITY REQUIREMENTS	DESIRE PORTABILITY
TYPICAL MONTHLY DBMSS EXPENDITURES	$1K - $100K
MAIN PRODUCTS SOUGHT	MACHINE AVAILABILITY
IMPORTANT VENDOR ATTRIBUTES	DBMSS AVAILABILITY
MAIN BENEFITS DESIRED	RELIABILITY CONVENIENCE
VENDOR EXAMPLE	INFORMATICS
VENDOR DBMSS EXAMPLE	IMS
VENDOR DBMSS TYPE	THIRD PARTY

b. Products and Benefits Sought

- Customers are seeking vendors with at least a minimum level of operational expertise with the specified Third Party data base management system.

- They are seeking machine capacity availability and convenience rather than a good deal of training and assistance.

c. Active Vendors, Growth Trends and Causes

- Any vendor currently running a popular Third Party DBMSS and having available machine capacity can participate in this market. One vendor doing a significant amount of business in this area is Informatics (IMS).

- This segment will show a small increase in revenues while experiencing a decline in market share.

- From an $8 million base in 1976 (4% market share), sales will increase to $12 million (2% share) by 1979 and to $19 million (2% share) in 1981.

- Market share will drop because:

    - Vendors have little interest in a commodity service with such volatile revenue.
    - Hardware and peripherals are getting cheaper so that in-house data base management system users, who are the primary customers for this market segment, will find it easier to acquire the additional machine capacity and thus avoid external costs.

12. EMERGING MARKETS

- Medium size companies with in-house DP resources which, historically have been a minor market for RCS and DBMSS, will become more attractive to DBMSS vendors. Reasons for this include:
    - Recently increased availability of cost effective data base management systems for operation on mid-sized computers. This does much to increase user awareness of data base advantages.
    - The need for medium size companies to practice more professional and analytical management techniques in order to compete against larger, more sophisticated competitors. Medium sized companies often are too large to enjoy the responsiveness and maneuverability of the smaller company, and too small to have the financial, technical and managerial resources of the larger organizations. DBMSS can help them be a stronger competitor.

IV. USER CHARACTERISTICS

IV USER CHARACTERISTICS

A. GENERAL CHARACTERISTICS

I. OVERVIEW

- As shown in Exhibit IV-1, vendors report that the most frequent customers for DBMSS are:
  - Large and very large (sales greater than $100 million annually) organizations
  - With multiple locations
  - With in-house computers
- Customers often have in-house Data Base Management Systems
- Although DBMSS is sold across industry lines by most vendors, 20% of the vendors interviewed indicated that banks and other financial institutions were the most frequently sold industry segments.
- Seventy-seven percent of the DBMSS users surveyed were located in the End User Department, while 23% were found in the DP center. (See Exhibit IV-2)

EXHIBIT IV-1

DBMSS CUSTOMER CHARACTERISTICS

TYPE DBMSS	VENDOR #	SIZE OF CUSTOMER ANNUAL REVENUE ($ MILLIONS)	INDUSTRIES MOST FREQUENTLY SOLD TO	OTHER FREQUENT CUSTOMER CHARACTERISTICS
PROPRIETARY DBMSS VENDORS	1	>$100	ALL	USUALLY HAVE OWN COMPUTER
	2	> 100	BANKS, FINANCIAL GOVERNMENT	SUBSIDIARIES, NOT PARENT CO.
	3	> 100	ALL	99% HAVE OWN COMPUTER
	4	> 250	BANKS, INSURANCE MANUFACTURERS	
	5	> 250	GOVERNMENT, LARGE MANUFACTURERS	MULTI-LOCATION
	6	> 100	ALL	MULTI-LOCATION
	7	> 250	BANKS, FINANCIAL INSTITUTIONS	
	8	> 30	ALL	
	9	"TOP 50"	FINANCIAL INSTITUTIONS	
	10	"TOP 50"	UTILITY COMPANIES	MULTI-LOCATION
	11	$20-100	ENGINEERING FIRMS	
THIRD PARTY DBMSS VENDORS	12	> 100	MANUFACTURERS WHOLESALERS	60% HAVE OWN COMPUTER; 90% HAVE DBMSS IN-HOUSE
	13	> 100	MANUFACTURERS UTILITIES	
	14	> 100	GOVERNMENT	
	15	NR	ALL	70% HAVE OWN COMPUTER
	16	NR	GOVERNMENT	

NR = NOT REPORTED

EXHIBIT IV-2

LOCATION AND DP BACKGROUND OF DBMSS USERS

DBMSS USER LOCATION	USER BACKGROUND		
	DP TRAINED	NON-DP TRAINED	TOTAL TOTAL
END USER DEPARTMENT	65% (11)	12% (2)	77% (13)
DP DEPARTMENT	23 (4)	--	23 (4)
TOTAL	88% (15)	12% (2)	100% (17)

( ) = NUMBER OF USERS RESPONDING

- Eighty-eight percent of the companies surveyed had a DP-trained individual as the primary user.

- Many of the 65% who were DP-trained and located in End User Departments felt non-DP usage capabilities were also very important because (a) their own DP background was not strong, and/or (b) they wanted other non-DP trained people in their department to use the system under their guidance.

2. EXTENT OF DBMSS EXPERIENCE

- Although several Proprietary and many Third Party vendors have been marketing DBMSS for five years, the DBMSS user population as a whole is relatively inexperienced. Exhibit IV-3 shows that 78% of the DBMSS users surveyed had less than two years of DBMSS experience, while 34% of the DBMSS users had less than one year.

- This user characteristic reflects the marked acceleration in Proprietary and Third Party DBMSS acceptance that has recently occurred.

- Several of the fast growing Proprietary DBMSS (e.g. IPL, MAGNUM, and NOMAD) were introduced in 1975.

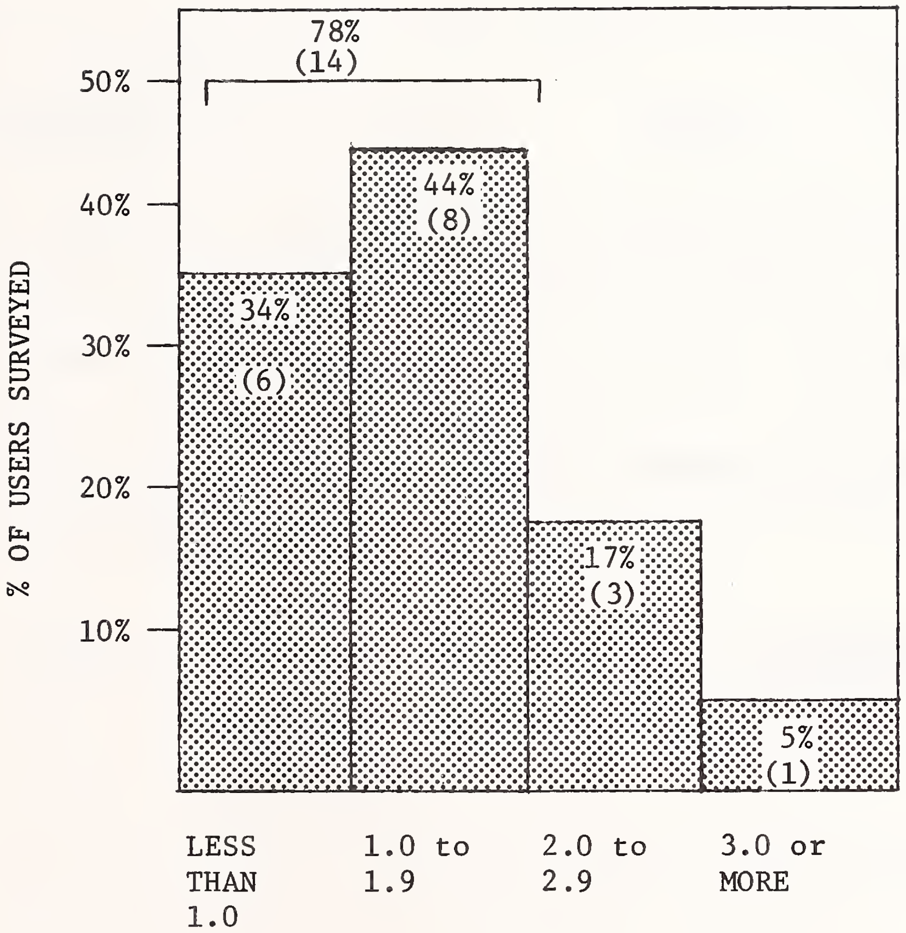
- Third Party DBMSS have enjoyed wider market interest in parallel with the upsurge in sales of data base management systems for in-house usage.

3. USER EXPENDITURES

- As shown in Exhibit IV-4, vendors interviewed reported that DBMSS revenues from a single customer ranged from $100 to $300,000 per month. The

EXHIBIT IV-3

USER DBMSS EXPERIENCE



YEARS OF DBMSS EXPERIENCE

( ) = NUMBER OF SURVEYED USERS

EXHIBIT IV-4

MONTHLY REVENUE PER DBMSS CUSTOMER*

CUSTOMER REVENUE SIZE	AVERAGE REVENUE	RANGE	# VENDORS REPORTING
LOWEST	$ 1,100	$100-$ 10,000	10
AVERAGE	3,300	1,500- 30,000	10
HIGHEST	85,200	7,000- 300,000	14

*AS REPORTED BY
DBMSS VENDORS

average, vendor-reported, customer revenue per month was $3,300.

- When asked to specify the lowest revenue per customer per month, vendors cited a range of from $100 to $10,000 with the average response being $1,100.

- When vendors were asked the revenue of their largest customer, the average of all responses was $85,200 with the range being $7,000 to $300,000.

- INPUT's user survey revealed customers falling into several distinct expenditure groups as illustrated in Exhibit IV-5.

- Seventy-four percent of the users surveyed paid vendors less than $5,000 per month, 10% had expenditures of from $5,000 to $50,000 per month, and 16% spend more than $50,000 per month.

- Exhibit IV-5 also indicated several revenue differences between Proprietary and Third Party DBMSS users:

  - Proprietary users were more often grouped in the $3,100 to $5,000 range, while Third Party users were more frequently in the next lower category ($1,000 to $3,000).
  - Proprietary users were found more frequently in the lowest range (less than $1,000) and in the mid-range ($5,000 to $20,000).
  - The average monthly user expenditure was almost twice as high for Proprietary than for Third Party users ($4,500 vs. $2,300). See Exhibit IV-6.
  - The very largest users (more than $50,000) were Third Party users.

EXHIBIT IV-5

PROPRIETARY AND THIRD PARTY DBMSS

USER EXPENDITURES

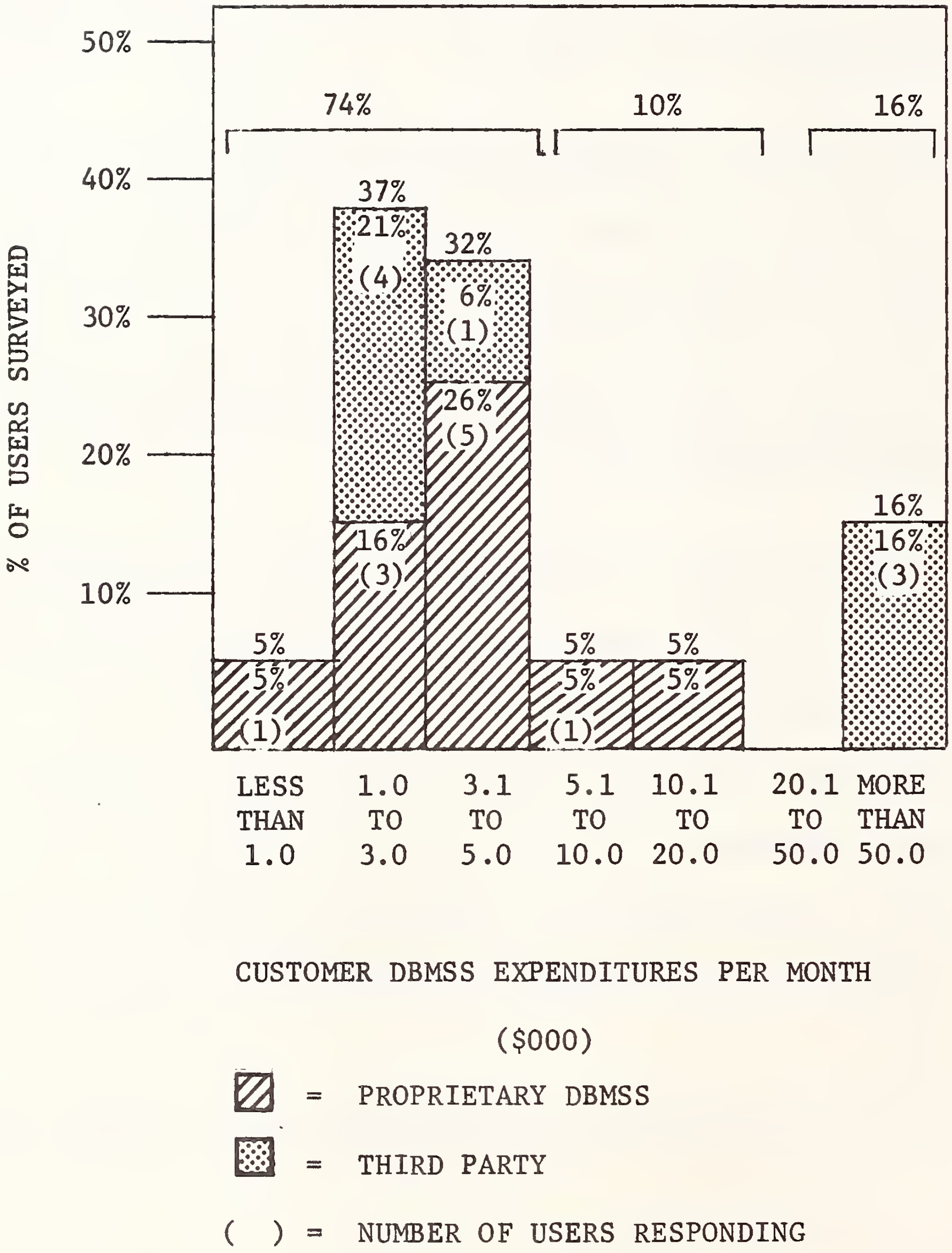


EXHIBIT IV-6

RESPONDENTS' AVERAGE DBMSS EXPENDITURES

TYPE CUSTOMER	CUSTOMER MONTHLY EXPENDITURE*
PROPRIETARY DBMSS	$4,500
THIRD PARTY DBMSS	2,300
AVERAGE	$3,800

*EXCLUDES TWO LARGEST REVENUE CUSTOMERS

4. DBMSS APPLICATION PROFILE

a. "Analytical' versus "Production" Applications

- "Analytical" applications are defined as those where most of the data processing involves manipulations of data already in the data base. "Production" applications involve a heavier use of transaction updating and reporting.

- Of the users surveyed:

  - Forty-four percent used DBMSS for "Analytical" applications, while 56% applied it to "Production" Systems (See Exhibit IV-7).
  - Third Party users apply DBMSS mostly (83%) to "Production" systems.
  - Proprietary users are just the opposite as 60% use it for "Analytical" systems.

b. Application Importance to the User

- Exhibit IV-8 shows that 80% of the users surveyed indicated that they selected DBMSS for the processing of applications they consider either "Critical" or "Very Important" to their organizations overall business operations.

- The willingness of DBMSS users to use an outside DBMSS service for such vital company functions is an important vote of confidence in the DBMSS itself and the vendor behind it.

- It is also telling commentary on the inability of many in-house DP department to provide services which are at the very heart of a company's operation.

EXHIBIT IV-7

"PRODUCTION" AND "ANALYTICAL"
USE OF DBMSS

TYPE OF APPLICATION	TYPE OF DBMSS		
	PROPRIETARY	THIRD PARTY	AVERAGE
ANALYTICAL	60% (6)	17% (1)	44% (7)
PRODUCTION	40 (4)	83 (5)	56 (9)
TOTAL	100% (10)	100% (6)	100% (16)

( ) = NUMBERS OF USERS RESPONDING

EXHIBIT IV-8

IMPORTANCE OF THE DBMSS APPLICATION TO THE USER'S COMPANY

TYPE OF DBMSS	APPLICATION IMPORTANCE		
	CRITICAL OR VERY IMPORTANT	OTHER	TOTAL
PROPRIETARY	71% (5)	29% (2)	100% (7)
THIRD PARTY	88 (7)	12 (1)	100 (8)
AVERAGE	80% (12)	20% (3)	100% (15)

c. Most Popular DBMSS Applications

- Exhibit IV-9 lists the most popular DBMSS applications by functional area. This list was compiled from vendor listings of frequently used DBMSS. Thus each entry on the list represents a popular application area for at least one vendor.

- Staff controlled functions were by far the most predominate in the top four most popular application areas, with 77% of all mentions in those specific groups.

- Staff controlled functions were 54% of all mentions in the survey as compared to 46% for operations controlled areas.

5. IN-HOUSE COMPUTER USAGE

- Exhibit IV-10 shows that 65% of the DBMSS user companies had their own inhouse computer.

- Companies buying Proprietary DBMSS have in-house computers 73% of the time as compared to 56% for Third Party DBMSS users. Although this seems initially to contradict the Third Party user's concern with software portability, it must be remembered that many Third Party users seek portability between RCS vendors in addition to (or in place of) in-house availability.

6. IN-HOUSE DATA BASE MANAGEMENT SYSTEM USAGE

- As shown in Exhibit IV-11, in-house data base management systems were present in half of the DBMSS customers surveyed who had in-house computers.

EXHIBIT IV-9

DBMSS APPLICATIONS
BY FUNCTIONAL AREA

FUNCTIONAL TYPE	FUNCTIONAL APPLICATIONS AREA	# MENTIONS EACH	# MENTIONS TOTAL	% OF TOTAL MENTIONS
STAFF	MARKETING		7	20%
	SALES ANALYSIS	3		
	MARKET RESEARCH	1		
	MARKET FORECASTING	1		
	PRICING	1		
	GENERAL	1		
STAFF	FINANCIAL		5	14%
	REPORTING	1		
	ANALYSIS	1		
	BUDGETING	1		
	FORECASTING	1		
	GENERAL	1		
STAFF	PERSONNEL		5	14%
OPERATIONS	INVENTORY CONTROL		5	14%
OPERATIONS	PRODUCT/PROJECT TRACKING		4	11%
OPERATIONS	ORDER ENTRY		3	9%
OPERATIONS	MANUFACTURING		2	6%
STAFF	ACCOUNTING		2	6%
OPERATIONS	DISTRIBUTION		1	3%
OPERATIONS	MAINTENANCE ENGINEERING		1	3%
	TOTAL MENTIONS		35	100%

EXHIBIT IV-10

IN-HOUSE COMPUTER
AVAILABILITY AMONG DBMSS USERS

IN-HOUSE COMPUTER	% OF USERS SURVEYED		
	PROPRIETARY DBMSS	THIRD-PARTY DBMSS	AVERAGE
YES	73% (8)	56% (5)	65% (13)
NO	27% (3)	44% (4)	35% (7)
TOTAL	100% (11)	100% (9)	100% (20)

( ) = NUMBER OF USERS RESPONDING

EXHIBIT IV-11

IN-HOUSE DATA BASE MANAGEMENT SYSTEM AVAILABILITY AMONG DBMSS USEERS

IN-HOUSE DATA BASE MANAGEMENT SYSTEMS*	PROPRIETARY DBMSS USERS	THIRD PARTY DBMSS USERS	AVERAGE
YES	60% (3)	50% (2)	56% (5)
NO	40% (2)	50% (2)	44% (4)
TOTAL	100% (5)	100% (4)	100% (9)

* FOR RESPONDENTS WITH IN-HOUSE COMPUTERS

( ) = NUMBER OF USERS RESPONDING

- Since customers which already have in-house data base management systems are generally more familiar with the concepts and users of such techniques, they may be more objective when evaluating DBMSS. Unique features and facilities of specific Proprietary DBMSS can be better understood and appreciated by them.

7. FEDERAL GOVERNMENT PREFERENCES

- Federal government agencies have a definite preference for Third Party rather than Proprietary DBMSS regardless of whether that unit has an in-house computer or not. One important reason is that the Federal Government is more oriented toward "compatability" and thus "portability" than is the commercial world.

8. "NEW" VERSUS "EXISTING" CUSTOMERS

- Eighty-three percent of the Third Party users responding indicated that the DBMSS service was their first usage of any service from that particular vendor. Proprietary DBMSS users were just the reverse, with 83% stating that the DBMSS service was not their first use of this vendor.

- Since users must have a great deal of trust in a vendor before committing to a non-portable Proprietary system, those with first hand experience with that vendor most frequently sign up first.

- An important question for Third Party vendors to explore is why they don't attract more of their existing customers to their Third Party DBMSS.

- Proprietary DBMSS vendors must find ways to gain more credibility for their own DBMSS so as to counterblance the fear of the unknown in first-time customers.

B. HOW USERS SELECT DBMSS

1. RATING OF SELECTION CRITERIA

- To better understand how prospects make many of the difficult trade-offs required when selecting a DBMSS, INPUT asked DBMSS users to prioritize the importance of each of six criteria to their final decision to choose a DBMSS.

- As shown in Exhibit IV-12, the combined score of both Proprietary and Third Party DBMSS users reveals three distinct tiers of "criteria importance".

  - The first tier (A) shows Vendor Service Reliability/Availability was by far the most important of the six criteria. No other criteria had a combined average score of less than 2.5.
  - The second tier (B) contains two criteria which ranked very near to one another. Data Base Management System Features was the second most important criteria while Vendor Technical Support was a close third.
  - The third tier (C) was far removed from the two higher A and B tiers and contained three criteria : Vendor Price, Portability of Software to a Non-DBMSS Computer, and Vendor Experience with Customer's Application Area.

2. RATING COMPARISONS

- Proprietary DBMSS users ranked the six criteria in a significantly different order than the Third Party DBMSS users:

  - It seemed clear in the minds of the Proprietary users that Service Reliability was the most important criteria. Third Party users were less

EXHIBIT IV-12

RESPONDENT RATINGS OF SIX CRITERIA FOR DBMSS SELECTION

CRITERION	COMBINED SCORE		PROPRIETARY DBMSS USERS	THIRD PARTY DBMSS USERS
	RATING TIER	RESULT		
VENDOR SERVICE RELIABILITY/ AVAILABILITY	A	1.7	1.5	2.0
DATA BASE MANAGEMENT SYSTEM FEATURES	B	2.5	3.1	2.0
VENDOR TECHNICAL SUPPORT	B	2.7	2.5	3.0
VENDOR PRICE	C	4.0	3.4	4.6
PORTABILITY OF SOFTWARE TO A NON-DBMSS COMPUTER	C	4.7	5.7	4.0
VENDOR EXPERIENCE WITH CUSTOMER'S APPLICATION AREA	C	5.0	4.7	5.4

METHOD OF RANKING

USERS WERE ASKED TO PRIORITIZE THE IMPORTANCE OF EACH OF THE SIX CRITERIA ABOVE TO THEIR FINAL DECISION IN SELECTING A DBMSS. THE MOST IMPORTANT CRITERION WAS TO BE GIVEN A "1", THE NEXT MOST IMPORTANT A "2", ETC. THE LEAST IMPORTANT CRITERION WAS GIVEN A "6".

ALL OF THE USER RATINGS WERE SUMMARIZED FOR EACH CRITERIA AND THEN DIVIDED BY THE NUMBER OF USERS WHO RATED. THE RESULT WAS AN AVERAGE RANKING FOR EACH CRITERION AS SHOWN ABOVE.

definite; they gave Service Reliability the same first place rating as they gave to Data Base Management Systems Features.

- Somewhat suprisingly, DBMS features were slightly more important to Third Party then Proprietary users.
- As expected, Software Portability was much more important to Third Party users. However, it was still one of the least important criteria.
- Even though both Proprietary and Third Party users differ on several of their rankings, they do agree that the first three criteria listed are, as a group, by far more important to their selection of a DBMSS than the bottom three criteria which included price.

3. ALTERNATIVES CONSIDERED

- Many potential DBMSS buyers have available a wide variety of other alternatives, such as:
  - In-house capability
  - Pre-packaged application packages for running on in-house computers
  - Data Base Management Systems for in-house use
  - Mini-computers
  - Mainframe add-ons (more cpu, memory, peripherals, etc.)
- The only option that users consistently considered was "in-house capability". Once this potential barrier to business for the DBMSS vendors is overcome, however, most users interviewed indicated that they looked at very few other options.
- However, since most vendors emphasize that the DBMSS area is "highly competitive" it is important to keep in mind that:

- Even though few alternatives are considered by the user today, those that are in the running are very strong competitors for the user's business.
- In the future, users will undoubtedly consider more alternatives than they have in the past due to increased visibility of products and vendors.

C. ATTITUDES TOWARDS DBMSS

1. WHAT USERS LIKE BEST

- When asked what they like best about their DBMSS, users most frequently replied "Ease of Use" (40% mentioned), "Vendor Technical Support" (27%) and "Flexibility" (20%).

- Third Party users mentioned "Vendor Technical Support" more often than did Proprietary users. This helps confirm that the vendors are actually delivering what they are promoting as a key selling point.

2. WHAT USERS LIKE LEAST

- "Documentation" and "Cost" were the most frequent complaints (33% of all answers) about DBMSS by both Proprietary and Third Party users.

- Forty percent of the Proprietary users also mentioned specific missing features they would like to see; however, their concern seemed to be more an annoyance than a serious objection.

D. LACK OF DBMSS AWARENESS

- There exists today a significant lack of awareness among the DP community at large that DBMSS services are available and viable. For example:

- INPUT's interviews with several nationally recognized authorities on Data Base Management Systems revealed that although many of them knew a great deal about data base concepts, applications and products available for in-house purchase, most of them had a very poor awareness of what DBMSS were available.
- A close study of the topics discussed in many nationally popular Data Base Management Systems seminars and evaluation services reveals that rarely do these influential activities include a discussion of DBMSS.
- The Association of Time Sharing Users (ATSU) recently published the first comprehensive directory of DBMSS after discovering that a surprising number of users were not aware of the wide variety of DBMSS. Sales of the directory are reported to be excellent.
- Some users complain that academic institutions often fail to seriously analyze or consider DBMSS in their research studies because the professor and researchers are unaware of unconvinced of its worthiness.

V. VENDOR AND PRODUCT ANALYSIS

V VENDOR AND PRODUCT ANALYSIS

A. VENDOR OVERVIEW

- This section describes and analyzes the market related characteristics of DBMSS vendors and the data base management systems which form the foundation for their services.

- The vendors surveyed by INPUT for this report account for:

  - $1.23 billion in computer services revenues in 1976
  - Thirty-eight percent of the total Remote Computing Services market

- Exhibit V-1 and 2 list, in alphabetical order, many of the most frequently mentioned Proprietary and Third Party DBMSS and their vendors and developers.

- Exhibit V-3 provides an alphabetical listing by vendor of the DBMSS services offered.

- Appendix A ("Vendor/Product Profiles") gives a brief description of the vendors and their DBMSS products.

EXHIBIT V-1

PROPRIETARY DBMSS:
VENDORS AND DEVELOPERS

PROPRIETARY DBMSS NAME	DBMSS VENDOR	DEVELOPER*
ALADIN	COMPUTER SCIENCES CORPORATION	
COMPOSIT	COMSHARE	
dbIV	UNIVERSITY COMPUTING COMPANY	
DMS, DMS II	GENERAL ELECTRIC - INF. SERVICES	
EXPRESS	TYMSHARE	MANAGEMENT DECISION SYSTEMS WALTHAM, MA
FISCAL	RAPIDATA	
FOCUS	TYMSHARE	INFORMATION BUILDERS NEW YORK, NY
I-D-S/II	HONEYWELL (DATANETWORK)	
IPL	AUTOMATIC DATA PROCESSING	NATIONAL INFORMATION SYSTEMS
MAGNUM	TYMSHARE	
MINI-MIS	SERVICE BUREAU COMPANY	
NOMAD	NATIONAL CSS	
OLIVER	ON-LINE SYSTEMS, INC.	
PROBE	RAPIDATA	
X2C	RAPIDATA	
XS1M	INTERACTIVE DATA	

*IF DIFFERENT FROM DBMSS VENDOR.

EXHIBIT V-2

THIRD PARTY DBMSS: VENDORS AND DEVELOPERS

THIRD PARTY DBMSS NAME	DBMSS VENDOR	DEVELOPER
ADABAS	PRC INFORMATION SCIENCES	SOFTWARE AG RESTON, VA
DBMS-10	RAPIDATA	RAPIDATA
IDMS	BOEING COMPUTER SERVICES SYSTEMS DIMENSIONS, LTD.	CULLINANE CORPORATION BOSTON, MA
IMS	MARTIN MARIETTA DATA SYSTEMS McDONNELL DOUGLAS AUTOMATION OPTIMUM SYSTEMS, INC. SYSTEMS DIMENSIONS, LTD.	IBM WHITE PLAINS, NY
INQUIRE	BOEING COMPUTER SERVICES COMPUTER NETWORK CORPORATION TYMSHARE	INFODATA
MODEL 204	COMPUTER NETWORK CORPORATION	COMPUTER CORPORATION OF AMERICA
RAMIS	NATIONAL CSS SYSTEMS DIMENSIONS, LTD.	MATHEMATICA
SYSTEM 1022	AUTOMATIC DATA PROCESSING TYMSHARE	SOFTWARE HOUSE WALTHAM, MA
SYSTEM 2000	BOEING COMPUTER SERVICES COMPUTER SCIENCES CORPORATION SYSTEMS DIMENSIONS, LTD. TYMSHARE	MRI AUSTIN, TX

EXHIBIT V-3

DBMSS OFFERED BY VENDORS

VENDOR	DBMSS OFFERED											
	PROPRIETARY		THIRD PARTY									
	DBMSS	TOTAL PROP.	ADABAS	IDMS	IMS	INQUIRE	MODEL 204	RAMIS RAMIS/II	SYS. 1022	SYS. 2000	TL. 3 PARTY	TOTAL DBMSS
AUTOMATIC DATA PROC.	IPL	1							X		1	2
BOEING COMPUTER SVCS.	---	--		X		X				X	3	3
COMPUTER SCI. CORP.	ALADIN	1								X	1	2
COMSHARE	COMPOSIT '77 PRO/FILES	2									--	2
COMPUTER NETWORK	---	--				X	X			X	3	3
DATANETWORK	I-D-S/II MDAS	2									--	2
GE-INFO. SERVICES	DMS, DMS/II	2									--	2
INTERACTIVE DATA CORP.	XDMS, XSIM	2									--	2
MARTIN MARIETTA DATA	---	--			X						1	1
McDONNELL DOUGLAS AUTO.	---	--			X						1	1
NATIONAL CSS	NOMAD	1						X			1	2
ON-LINE SYSTEMS	OLIVER	1									--	1
OPTIMUM SYSTEMS	---	--			X						1	1
PRC INFORMATION SCI.	---	--	X								1	1
RAPIDATA	DBMS-10, X2C FISCAL, PROBE	4									--	4
SERVICE BUREAU CO.	MINI-MIS	1									--	1
SYSTEMS DIMENSIONS	---	--		X	X			X		X	4	4
TYMSHARE	MAGNUM, FORCE EXPRESS	3				X			X	X	3	6
UNIVERSITY COMPUTING	dbIV	1									--	1
TOTAL		21	1	2	4	3	1	2	2	5	20	41

1. LEADING VENDORS

- As shown in Exhibit V-4, the leading vendors in terms of DBMSS revenues received are Automatic Data Processing, Computer Sciences Corporation, General Electric - Information Services, McDonnell Douglas Automation, National CSS, Service Bureau Company and Tymshare.

- As a group, these seven vendors had 73% of the total DBMSS revenues collected by the surveyed companies.

- Six out of seven of these vendors relied primarily on Proprietary DBMSS to obtain their market shares. McDonnell Douglas Automation was the only leading DBMSS revenue vendor to rely on Third Party DBMSS.

- All have been marketing DBMSS for more than three years and several have been selling DBMSS for over five years (McDonnell Douglas Automation, National CSS, Service Bureau Company and Tymshare).

- Of these large DBMSS vendors, the sellers with some of the fastest growing DBMSS are National CSS and Tymshare, both of which got their initial DBMSS experience with Third Party systems, then switched to Proprietary systems in 1975.

2. SALES BY VENDOR SIZE

- As shown in Exhibit V-5, the average DBMSS revenue per vendor surveyed was $4.7 million.

- The range was from a low of $200K to a high of more than $10 million annually.

EXHIBIT V-4

VENDOR RANKINGS BY DBMSS REVENUES

ESTIMATED 1976 DBMSS REVENUES PER VENDOR ($ MILLION)	VENDOR PROPRIETARY	TOTAL RCS REVENUES ($ MILLION)	VENDOR THIRD PARTY	TOTAL RCS REVENUES ($ MILLION)	TOTAL # VENDORS
MORE THAN 9	COMPUTER SCIENCES CORP. GENERAL ELECTRIC-INFO. SVC. SERVICE BUREAU COMPANY	52 90 61			3
5 - 9	AUTOMATIC DATA PROCESSING NATIONAL CSS TYMSHARE	28 32 54	McDONNELL DOUGLAS AUTO.	35*	4
1 - 5	COMSHARE INTERACTIVE DATA CORP. ON-LINE SYSTEMS RAPIDATA	14 12 11 16	OPTIMUM SYSTEMS, INC. SYSTEMS DIMENSIONS LTD.	10 21	6
LESS THAN 1	UNIVERSITY COMPUTING COMPANY	18	BOEING COMPUTER SERVICES COMPUTER NETWORK CORPORATION MARTIN MARIETTA DATA SYSTEMS	20* 7 6*	4
TOTAL - # VENDORS	11		6		17
TOTAL ESTIMATED 1976 DBMSS REVENUE	$66.6 MILLION		$12.3 MILLION		$78.9M

CODES

( ) = ESTIMATED U.S.A. REMOTE COMPUTING SERVICES REVENUES IN $ MILLIONS.

* = EXTERNAL REVENUES ONLY

EXHIBIT V-5

1976 DBMSS REVENUES BY VENDOR SIZE

% OF TOTAL REMOTE COMPUTER SVCS. OBTAINED FROM DBMSS	ESTIMATED AVERAGE DBMSS REVENUES PER VENDOR	REMOTE COMPUTING SERVICES REVENUES CATEGORY	VENDOR	1976 REMOTE COMPUTING SERVICES REVENUES		1976 DBMSS REVENUES	
				($M)	% OF TOTAL	($)	% OF TOTAL
		LESS THAN $20 MILLION	COMPUTER NETWORK	7			
			COMSHARE	14			
			INTERACTIVE DATA	12			
			ON-LINE SYSTEMS	11			
			OPTIMUM SYSTEMS	10			
			RAPIDATA	15			
			UNIVERSITY COMP.	18			
21.7%	2.7		SUB-TOTAL	87	16.4%	18.9	24.0%
		$20 TO $50 MILLION	AUTOMATIC DATA PROCESSING	28			
			BOEING COMPUTER SERVICES	20*			
			MARTIN MARIETTA DATA SYSTEMS	6*			
			McDONNELL DOUGLAS AUTOMATION	35*			
			NATIONAL CSS	32			
			SYSTEMS DIMENSIONS	21			
17.3%	4.1		SUB-TOTAL	142	35.1%	24.6	31.2%
		MORE THAN $50 MILLION	COMPUTER SCIENCES	52			
			GENERAL ELECTRIC INFO. SERVICES	90			
			SERVICE BUREAU CO.	61			
			TYMSHARE	54			
13.8%	8.9		SUB-TOTAL	257	48.5%	35.4	44.8%
16.2%	4.7		TOTAL	486	100 %	78.9	100 %

ALL RCS REVENUE FIGURES ARE ESTIMATES FOR 1976 NORTH AMERICAN TOTALS.

*EXTERNAL FIGURES ONLY

- Generally speaking, the larger the RCS vendor, the more revenues it derives from DBMSS.

- The "More Than $50 Million" group constituted 48.5% of all RCS revenues and 44.8% of all DBMSS sales of the surveyed group. The average DBMSS revenue was $8.9 million, the highest of the three groups.

- As a group, however, the smaller RCS vendors ("Less Than $20 Million") obtain a much higher percentage of their RCS revenues from DBMSS (21.7%). The next two larger groups obtain 13.2% and 13.8%, respectively, of RCS sales from DBMSS.

- Within each group, significant deviations from the averages occur. Of the ten vendors listed with computer services sales of over $20 million, seven obtain more than $5 million per year from DBMSS, while three obtain less than $2 million per year. (Boeing Computer Services, Martin Marietta Data Systems, and Systems Dimensions, Ltd.)

- Of the seven vendors with RCS sales under $20 million, two of them have DBMSS sales of less than $1 million annually (Computer Network Corporation and University Computing Company), while the five others have DBMSS sales of $2.5 million and up.

- Thus the larger RCS vendors fall into two distinct categories. They have either already deeply committed themselves to DBMSS and are leading the industry in DBMSS revenues, or else they have historically made little commitment and therefore obtain less DBMSS revenues than many much smaller RCS vendors.

3. PROPRIETARY VERSUS THIRD PARTY VENDORS

- Exhibit V-6 indicates that Proprietary vendors as a group sold over 4 times as much DBMSS services than did Third Party vendors ($56.6 vs. $12.8 million).

- In addition, Proprietary sellers receive, per vendor, over 3 times as much annual revenue from DBMSS services than do Third Party vendors ($5.7 vs. $1.8 million per vendor). (While many Proprietary vendors have sold or are selling Third Party DBMSS also, Proprietary systems contribute the bulk of their sales.)

4. DBMSS EMPHASIS BY VENDORS

- Companies are considered to be DBMSS "Specialists" if they have 20% or more of their total RCS revenues coming from DBMSS. Seven companies surveyed fall into this "DBMSS Specialist" category, as shown in Exhibit V-7.

5. CUSTOMER SITE PENETRATION

- As shown in Exhibit V-8, 42% of the vendors surveyed had a relatively small customer site penetration (i.e., less than 50), 21% had a medium penetration (51 to 400 sites), and 27% had a high penetration level (over 400 sites).

- Every Third Party vendor surveyed had less than 50 customer sites.

- A vendor's number of customer sites correlates reasonably well with DBMSS revenue size. The only major exception is McDonnell Douglas Automation which, although having fewer than 50 customer sites, has "over $5 million" in DBMSS revenues.

EXHIBIT V-6

PROPRIETARY AND THIRD PARTY DBMSS REVENUES
($ MILLION)

DBMS OWNERSHIP	ESTIMATED 1976 DBMSS REVENUES	NO. VENDORS SURVEYED	AVERAGE ANNUAL REVENUE PER VENDOR
PROPRIETARY	$ 56.6	10	$ 5.7
THIRD PARTY	12.8	7	1.8
TOTAL	69.4	17	4.1

EXHIBIT V-7

PROPORTION OF VENDORS' SALES OBTAINED FROM DBMSS

% OF REMOTE COMPUTING REVENUES OBTAINED FROM DBMSS	VENDOR	EST. 1976 REMOTE COMPUTING SERVICES REVENUES ($ MILLION)	MAIN DBMSS	# YRS. ON MKT.	TYPE DBMSS*
GREATER THAN 30%	COMSHARE	$14	COMPOSIT '77	6	PROP
	ON-LINE SYSTEMS	11	OLIVER	6	PROP
20-30%	AUTOMATIC DATA PROC.	$28	IPL	2	PROP
	INTERACTIVE DATA CORP.	12	XDMS XSIM	1 6	PROP PROP
	NATIONAL CSS	32	NOMAD RAMIS RAMIS II	1½ 8 1/3	PROP 3P 3P
	OPTIMUM SYSTEMS, INC.	10	IMS	5	3P
	RAPIDATA	15	DBMS-10 X2C FISCAL	3 2 1	3P PROP PROP
10-19%	COMNET	$ 7	INQUIRE M204 S2000	6 3 6	3P 3P 3P
	COMPUTER SCIENCES CORP.	52	ALADIN	2	PROP
	GENERAL ELECTRIC - INFORMATION SERVICES	90	DMS DMSII	3 0	PROP PROP
	McDONNELL DOUGLAS AUTOM.	35	IMS	5	3P
	SERVICE BUREAU COMPANY	61	MINI-MIS	8	PROP
	TYMSHARE	54	MAGNUM FOCUS EXPRESS S2000 INQUIRE	1½ ½ 3 4 4	PROP PROP PROP 3P 3P
LESS THAN 10%	BOEING COMPUTER SERVICES	$20	S2000 IDMS INQUIRE	1 1 3	3P 3P 3P
	MARTIN MARIETTA DATA SYS.	6	IMS	4	3P
	SYSTEMS DIMENSIONS, LTD.	21	IDMS IMS S2000 RAMIS	2 4 2 3	3P 3P 3P 3P
	UNIVERSITY COMPUTING CO.	$18	dbIV	2	PROP

*PROP = PROPRIETARY
3P = THIRD PARTY

EXHIBIT V-8

MARKET PENETRATION BASED ON NUMBER OF DBMSS CUSTOMER SITES

VENDOR NAME	YR. OF 1ST DBMSS MKT. INTRO.	ESTIMATED # DBMSS CUSTOMER SITES				
		SMALL	MEDIUM		LARGE	
		LESS	51 TO 200	201 TO 400	401 TO 600	OVER 600
AUTOMATIC DATA PROCESSING	1975			X		
BOEING COMPUTER SERVICES	1974	X*				
COMPUTER SCIENCES CORP.	1974					X
COMSHARE	1971				X	
COMPUTER NETWORK CORP.	1971					
DATANETWORK	1975			X		
GENERAL ELECTRIC-INFO. SVCS.	1974					X
INTERACTIVE DATA CORPORATION	1971					X
MARTIN MARIETTA DATA SYSTEMS	1973	X*				
McDONNELL DOUGLAS AUTOMATION	1972	X*				
NATIONAL CSS	1969					X
ON-LINE SYSTEMS, INC.	1970			X		
OPTIMUM SYSTEMS, INC.	1972	X*				
PRC INFORMATION SCIENCES	1975	X*				
RAPIDATA	1974				X	
SERVICE BUREAU COMPANY	1969					X
SYSTEMS DIMENSIONS, LTD.	1973	X*				
TYMSHARE	1974			X		
UNIVERSITY COMPUTING COMPANY	1975	X				
TOTAL	#	8	0	4	2	5
	%	42%	0%	21%	11%	26%

*EXCLUSIVELY A THIRD PARTY DBMSS VENDOR.

B. PRODUCT CHARACTERISTICS

I. CAPABILITIES

- Data base management systems are a major technological development equal in importance to the development of operating systems.
- A key advantage is that they increase programmer productivity by assuming many of the complex and tedious tasks of storing, updating and accessing data. As a result, systems can be developed and information obtained faster, easier and more flexibly.
- No single data base management system, however, is optimal under all performance criteria.
- DBMSS vendors, therefore, attempt to gain a competitive edge by marketing data base management systems which they believe to be best fitted to the markets they wish to serve. As a result, many different types of systems are found on the market today.
- The decision process for selecting a DBMSS to market is complex. Vendors must consider a very large number of product characteristic variables, such as:
  - Application Characteristics
    - Size of Data Base
    - Volume of transaction for inquiries and update
    - Predictability of Inquiry
    - Frequency of Update
    - Frequency of Inquiry

- User DP Skill Requirements For
  - Data Base Implementation
  - Application Programming
  - Inquiries
  - Data Base Modification
- Method of Operation
  - Data Structure
    - Hierarchical
    - Network (Ring)
    - Inverted File
    - Relationship
  - Type of Language
    - Host (e.g. COBOL, FORTRAN, ASSEMBLER, PL/I)
    - Self-Contained
- Computer Hardware Requirements
  - Manufacturer
  - Core
  - Peripherals
- Processing Efficiencies
- Mode of Delivery
  - Interactive
  - Remote Batch
  - Batch services

- Compounding the difficulty of the vendors selection process are the many performance trade-offs which must be made. For example, a system may have:

- Ease of inquiry but slow processing efficiencies.
- Flexibility of change but increased running costs.
- Ease of modifications but complexity of initial data base implementation.
- Much flexibility in usage but requirements for a highly skilled programmer for set-up.

2. HARDWARE

- As shown in Exhibit V-9, the most popular computer for DBMSS use is the IBM 360/370. It is used for 52% of all DBMSS surveyed.

- Digital Equipment's DEC System-10 is the second most widely used DBMSS hardware with 24% of all mentions.

3. DATA STRUCTURE

- The data structure of a data base management system has an important impact on its operational characteristics.

- The DBMSS analyzed for this report primarily employ one or more of the following data structures: Hierarchical, Inverted List, Network or Relational.

- As shown in Exhibit V-10, each of the four structures is used by several of the DBMSS surveyed.

- Each data structure has its own unique advantages and disadvantages:

  - For Hierarchical data structures the advantages include the ability to allow logical relationships, ease of graphic representation, good

EXHIBIT V-9

COMPUTERS USED FOR DBMSS

TYPE OF DBMSS	PRIMARY HARDWARE IMPLEMENTATION				
	IBM 360/370	DEC SYSTEM-10	UNIVAC 1108	CDC 6000	HONEY-WELL
PROPRIETARY	EXPRESS FOCUS MINI-MIS NOMAD XDMS	IPL MAGNUM OLIVER	ALADIN dbIV		DMS
THIRD PARTY	ADABAS IDMS IMS INQUIRE MODEL 204 SYSTEM 2000	DBMS-10 SYSTEM 1022		SYSTEM 2000	I-D-S

EXHIBIT V-10

DBMSS DATA STRUCTURES

TYPE OF DBMSS	DATA STRUCTURES			
	HIERARCHIAL	INVERTED	NETWORK	RELATIONAL
PROPRIETARY	ALADIN MINI-MIS	ALADIN	OLIVER	dbIV MAGNUM NOMAD
THIRD PARTY	IMS IDMS I-D-S/II INQUIRE	ADABAS INQUIRE MODEL 204 SYSTEM 2000	ADABAS DBMS-10 IDMS I-D-S/II INQUIRE	ADABAS* INQUIRE*

*RECENT UPGRADES TO RELATIONAL.

complex data structure representation, and ability to eliminate most redundant data. On the other hand, designers find it hard to understand and it imposes a high overhead.

- For Inverted List structures, advantages include good on-line characteristics, low system overhead and high speed sequential processing abilities. Disadvantages include some performance slowness on certain types of inquiries.
- Network data structure advantages include low memory requirements, fast access to the master file and ease of addition of new records with one index. Disadvantages are the requirement for a high level of technical expertise, lack of sequential processing, limited on-line capability and difficulty of modifications.
- The Relational data structure is the newest of the four. It has such advantages as a very high degree of data independence and an ability to store data in non-redundant form. The main drawback of the Relational structure is performance.

4. APPLICATION AND DP SKILL ORIENTATION

- Two of the most important determinants of to which market segment a DBMSS will appeal are:
  - Application type best suited for processing (e.g. Production or Analytical).
  - DP Skill Requirements (e.g. Much, Some, Little/None).

- Exhibit V-11 illustrates that Proprietary DBMSS generally require less DP skill from users than Third Party systems.

- Exhibit V-12 lists DBMSS that primarily appeal to either Production or Analytical systems.

5. PROPRIETARY VERSUS THIRD PARTY COMPARISONS

- Since Relational structures improve ease of use, Proprietary vendors have adopted its usage more readily than Third Party vendors to date.

- The two most highly successful Relational DBMSS are both Proprietary systems (MAGNUM from Tymshare and NOMAD from National CSS). In addition, University Computing Company offers dbIV as a Relational DBMSS.

- The definite movement to Relational DBMSS is illustrated by the recent announcements of the addition of Relational capabilities to ADABAS and INQUIRE.

- Many of the Proprietary DBMSS have self-contained languages which improve ease of use for non-DP trained users. This is in contrast to most Third Party DBMSS which interface with COBOL and other widely used procedural languages which are DP-user oriented.

C. PRODUCT INTRODUCTION TRENDS

- The rates of DBMSS product introductions has accelerated markedly in the past 3 years. Since early 1974, more than three times as many DBMSS have been brought to the marketplace as had been introduced in the 5 years prior to that date. (See Exhibits V-13 and V-14).

EXHIBIT V-11

DP SKILL DEMANDS FOR DBMSS USE

	EXTENT OF DP SKILL DESIRED		
TYPE OF DBMSS	MUCH	SOME	LITTLE/NONE
PROPRIETARY		ALADIN dbIV DMS IPL OLIVER XDMS	FOCUS EXPRESS MAGNUM NOMAD
THIRD PARTY	IDMS IMS RAMIS	DBMS-10 INQUIRE MODEL 204 RAMIS II	

EXHIBIT V-12

DBMSS APPLICATION CHARACTERISTICS

TYPE OF DBMSS	TYPE OF APPLICATION	
	PRODUCTION	ANALYTICAL
PROPRIETARY	ALADIN IPL MAGNUM OLIVER XDMS	EXPRESS FOCUS MINI-MIS NOMAD
THIRD PARTY	IMS	SYSTEM 1022 SYSTEM 2000

EXHIBIT V-13

DBMSS PRODUCT INTRODUCTIONS BY YEAR

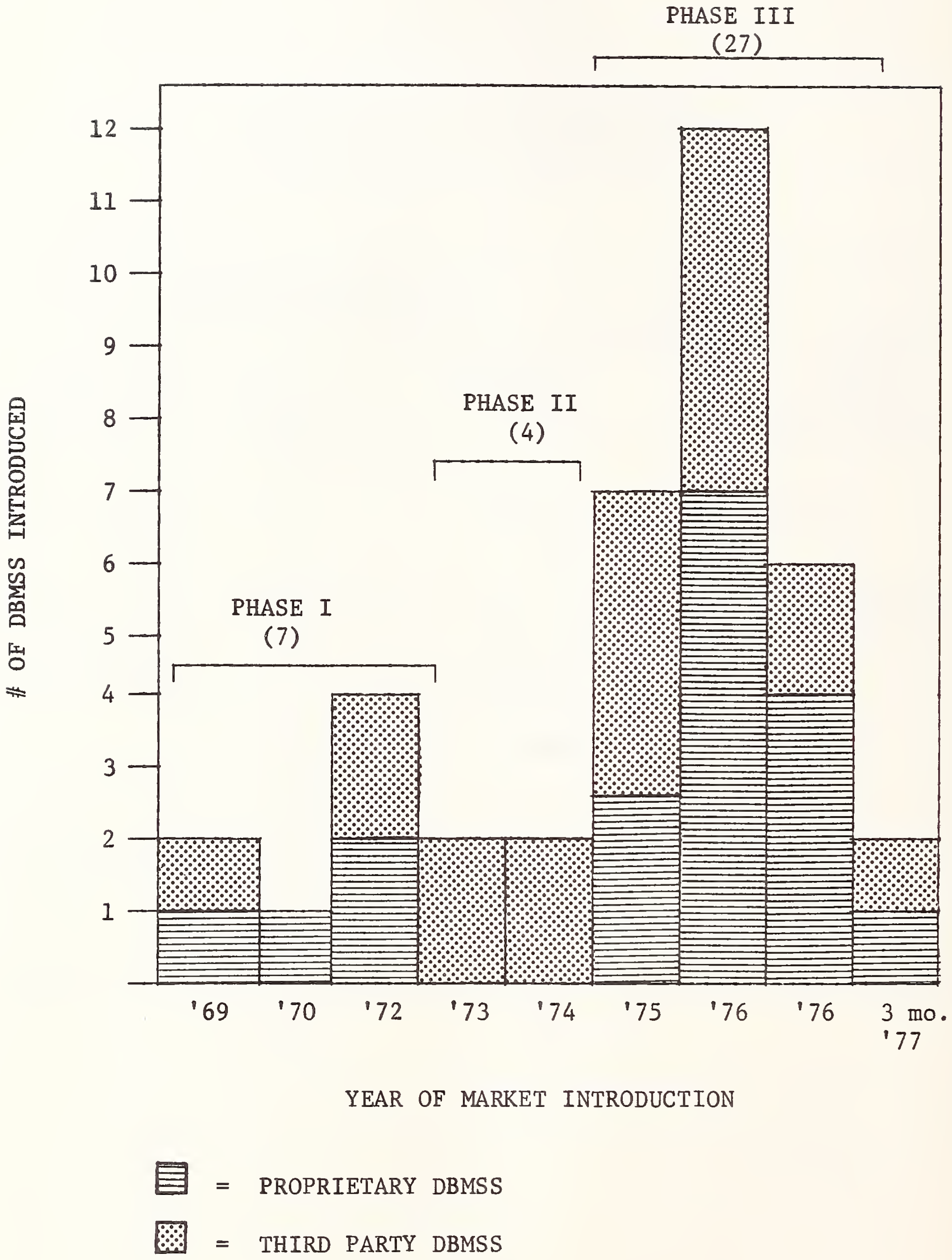


EXHIBIT V-14

DBMSS PRODUCT INTRODUCTIONS BY VENDOR AND YEAR

VENDOR	69	70	71	72	73	74	75	76	77	TOTAL # YEARS MKT. DBMSS
AUTOMATIC DATA PROCESSING							IPL*			2
BOEING COMPUTER SERVICES						INQUIRE		IDMS S2000		3
COMPUTER SCIENCES CORP.						S2000	ALADIN*	ALADIN/II*		3
COMSHARE			COMPOSIT '77*							6
COMPUTER NETWORK CORP.			INQUIRE S2000			MODEL 204				3
DATANETWORK							I-D-S/II MDQS			2
GENERAL ELECTRIC-INFO. SERVICES						DMS*			DMS/II*	3
INTERACTIVE DATA CORP.			XSIM*				XDMS*			6
MARTIN MARIETTA DATA SYS.					IMS					4
McDONNELL DOUGLAS AUTO.				IMS						5
NATIONAL CSS	RAMIS						NOMAD*		RAMIS II	8
ON-LINE SYSTEMS, INC.		OLIVER*								7
OPTIMUM SYSTEMS, INC.				IMS						5
PRC INFORMATION SCIENCES							ADABAS			2
RAPIDATA						DBMS-10	X2C*	FISCAL*		3
SERVICE BUREAU COMPANY	MINI-MIS*									8
SYSTEMS DIMENSIONS LTD.					IMS	RAMIS	IDMS S2000			4
TYMSHARE					S2000 S1022 INQUIRE	EXPRESS*	MAGNUM*	MAGNUM/ OPUS* FOCUS*		4
UNIVERSITY COMPUTING CO.							dbIV*			2

* = PROPRIETARY DBMSS

- For the DBMSS surveyed, 1975 was the most active year with nearly twice as many DBMSS introduced (12 in total) as has been experienced in any other year.

- Currently the average number of years on the market for all DBMSS researched in 3.3 years.

- Market introductions have occurred in three distinct phases since 1969.

  - Phase I (1969 to 1971) marked the first appearance of DBMSS. Of seven systems listed, four are Proprietary systems (COMPOSIT '77 (Comshare), MINI-MIS (Service Bureau Corporation), OLIVER (On-Line Systems) and XSIM (Interactive Data)) still active in the market today.
  - Phase II (1972 to 1973) represented a slowdown in Proprietary DBMSS introductions. Four Third Party and no Proprietary systems surveyed came onto the marketplace.
  - Phase III (1974 to date) represents a very large increase in DBMSS introductions. Of the 27 DBMSS brought to market during this period, 15 were Proprietary and 12 were Third Party.

- Product introductions since 1975 have, with one exception, been upgrades and/or derivatives of DBMSS initially introduced during the 1974-75 era.

- Several more DBMSS introductions will occur in 1977 but at a rate closer to 1976 than to the record breaking pace of 1975.

D. DBMSS IMPORTANCE TO VENDOR CORPORATE GOALS

- DBMSS vendors surveyed were almost unanimous in stating that DBMSS had "much" importance to overall corporate goals.

- This emphasis on DBMSS was strong regardless of whether the vendor's current DBMSS revenue level was large or small. It was also strong among both Proprietary and Third Party DBMSS.

- Typical comments received from various vendors included:

  "Our DBMSS revenue is not great now, but it is important to our company's overall goals due to competition, ease of application development and ability to serve customers in multiple industries with one global data base."

  "DBMSS is very important. With mini-computers coming, there is a great need for national network services with multiple location update and inquiry."

  "It broadens our basis service."

  "It is where most of the revenue is."

  "DBMSS is our primary implementation tool for customer work."

  "It is our company's number one area of emphasis. We want to get away from time sales and be more competitive with state-of-the-art solutions."

  "Every major product we offer involves our DBMSS in one formor another."

  "It is the fastest growing service in our company."

E. VENDOR PERCEPTIONS OF CUSTOMER MOTIVES

I. WHY CUSTOMERS BUY

- When asked why customers buy, vendors most frequently cited Quality of Customer Support (30% of all mentions).

- Vendors also stressed the importance of Good, Local Field Support Personnel.

- Proprietary vendors felt that Product Features was the second most important reason why customers buy.

- Third Party vendors, in contrast, did not emphasize Product Features, but instead cited a number of other reasons not mentioned by Proprietary vendors such as:

  - Expertise in the Data Base Management System
  - Price
  - Expertise in the Application Area
  - Vendor Stability

2. WHY CUSTOMERS WON'T BUY

- Both Proprietary and Third Party vendors said that Price was the most common reason why customers would not buy their particular service. However, it was not a universal problem in that Price constituted only 20% of all mentions.

- Price is more often a problem to first time RCS users than to experienced ones. In some cases, vendors lose on Price because competitors will offer a fixed price and/or free programming.

- In spite of the fact that Proprietary vendors indicated that Product Features was one of the most important reasons why customers did buy, Absence of Product Features only received 8% of all mentions why customers did not buy.

- Fifteen percent of the Proprietary vendors stated that the lack of availability of the DBMSS for eventual in-house use was a hindrance to the sale.

- Eleven percent of the responses cited Mini-Computers.

F. COMPETITION

- DBMSS vendors face a very competitive marketplace

- The primary source of difficulty for the vendors is the quantity and diversity of competitive alternatives rather than the strength of any specific group.

- In-House DP Resources is the competitive alternative encountered on almost every sale.

- Competitive alternates encountered "sometimes" are:

  - Other DBMSS Vendors
  - Mini-Computers
  - Applications Software Products Vendors
  - Hardware Vendors (CPU, Memory, Peripherals)

- Proprietary vendors state that they compete with other Proprietary vendors more than twice as often as with Third Party vendors, as shown in Exhibit V-15. Third Party vendors also report Proprietary sellers are the main competition.

- The DBMSS marketplace continues to be fragmented. Although most vendors surveyed offer their DBMSS nationally, few of them are consistently strong throughout the country.

- Competition occurs almost exclusively while the user is deciding which DBMSS to select. Rarely does a vendor lose a DBMSS customer to another DBMSS vendor after the installation.

- As shown in Exhibit V-15, Tymshare and National CSS and their products are clearly the leading competitors; with Tymshare probably leading due to the number of DBMSS offered. On the other hand, Tymshare may lose some efficiency compared to NCSS because of the selling complexities introduced by the variety of its DBMSS.

G. VENDOR PERCEIVED KEYS TO SUCCESS

- The most frequently mentioned key to success (15% of all responses) was Relating Problems to Solutions. The vendor must have people who can understand the customer's problem and relate it effectively to a reasonable, cost effective solution. This aspect of DBMSS rates high in importance because the misapplication of a problem to a DBMSS solution, or the development of an ineffective design solution to an appropriate DBMSS problem, will result in an awkward system, excessive processing costs, and ultimately, an unhappy customer.

- The second most often mentioned keys to success were Customer Support and Product Features. Each received 12% of the mentions.

    - Customer support is considered essential because DBMSS is a new technology which is unfamiliar and complex to a majority of users. A customer who does not understand the system will not use it and unused systems mean lost processing revenues to DBMSS vendors.

EXHIBIT V-15

MAIN DBMSS COMPETITORS CITED BY VENDORS

TYPE	MAIN COMPETITORS	# OF MENTIONS		
		BY PROPRIETARY VENDORS	BY THIRD PARTY VENDORS	TOTAL
THIRD PARTY	BOEING COMPUTER SVCS.		3	3
	DBMS-10	3		3
	I-D-S	1		1
	McDONNELL DOUGLAS AUTO		1	1
	RAMIS	2		2
	SYSTEM 2000	2	1	3
	SUB-TOTAL	# 8	5	13
		% 29%	38%	32%
PROPRIETARY	ALADIN	2	1	3
	DMS	1	2	3
	FOCUS	4		4
	IPL	1	1	2
	MAGNUM	2		2
	MINI-MIS	1		1
	NATIONAL CSS		2	2
	NOMAD	6		6
	OLIVER	2		2
	TYMSHARE	1	2	3
	SUB-TOTAL	# 20	8	28
		% 71%	62%	68%
TOTAL		# 28	13	41
		% 100%	100%	100%

- Product Features are important because different markets require different product characteristics. The DBMSS vendor must be certain that it is offering a product which is designed to fit well with the specific market it wishes to address.

- Reliability was mentioned by 10% of the vendors. This requirement is not unique to DBMSS, but is a functional, universal requirement for any service offered by RCS vendor. The low rating given this area by vendors is surprising considering its previously mentioned importance to users.

- Other items cited as keys to success by at least 5% of the vendors were:
  - Superior Technical Support
  - Effective Marketing and Sales
  - Overall Company Experience with DBMSS

H. CHALLENGES AND OPPORTUNITIES

I. PROBLEM AREAS CITED

- When asked to indicate the main problems they face in pursuing the DBMSS market, most of the vendor's responses dealt with ways to respond to market growth opportunities.
  - Training Internal Personnel (Especially Salesmen and Support People) was the most often cited problem area (19% of all responses).
  - The second most frequent problems (15% each) were Finding Good People, and Indentifying the Best Way to Penetrate Specific Markets.

- Other problem areas mentioned were:

    - Providing Better Customer Education and Support
    - Dealing with Competition (especially Mini-Computers)
    - Getting the Salesmen to Push DBMSS
    - Long Sales Cycle
    - Communication and TP Costs

- Only one response out of 26 mentioned Operational Complexities of Running a Data Base Management System for multiple customers with diverse requirements.

2. VENDOR OUTLOOK AND PLANS

- DBMSS vendors see continued strong revenue growth ahead.

- Proprietary vendors foresee an average sales growth for 1977 over 1976 of 66%. That is more than twice the 30% rate Third Party vendors forecasted for themselves.

- Proprietary vendors are also more optimistic than Third Party sellers for 1978. Proprietary's 50% growth rate for 1978 over 1977 is exactly twice the 25% foreseen by Third Party vendors.

- When questioned about their plans for the next few years, vendors cited a variety of options under serious consideration. Alternatives mentioned by one or more vendors include:

    - Increased emphasis on Pre-Packaged Applications
    - Incorporation of Mini-Computers into the DBMSS offering

- Consideration of marketing the DBMSS with a software product option for seeking portability to in-house use
- Significant product enchancements
- Slimming of a vendor's product line to include fewer Third Party DBMSS
- More emphasis on Custom Programming and less focus on Pre-Packaged Applications
- Train salesmen to be better problem solvers
- Increased emphasis on new account marketing rather than revenue expansion of existing accounts
- Striving to get the customers to undertake more of their own programming

VI. MARKETING AND TECHNICAL REQUIREMENTS

VI MARKETING AND TECHNICAL REQUIREMENTS

A. PRODUCT STRATEGIES

- Most DBMSS vendors are currently emphasizing one or more of the following five basic product strategies:

  #1: SELLING "SELF-HELP"
  #2: SELLING AS A "LANGUAGE"
  #3: SELLING AS A "TOOL"
  #4: SELLING AS "CUSTOM PROGRAMMING"
  #5: SELLING AS "PRE-PACKAGED APPLICATIONS"

- As shown in Exhibit VI-1 and 2, each of these five strategies has significant implications for the vendors in terms of revenue potential, ease of market entry, vendor investment and market segment focus.

- The basic characteristics of each of these strategies are as follows:

1. BASIC STRATEGY #1: SELLING "SELF-HELP"

- This strategy is primarily a commodity approach which invites the customer to "do- it-yourself".

EXHIBIT VI-1

DBMSS PRODUCT

STRATEGY IMPLICATIONS

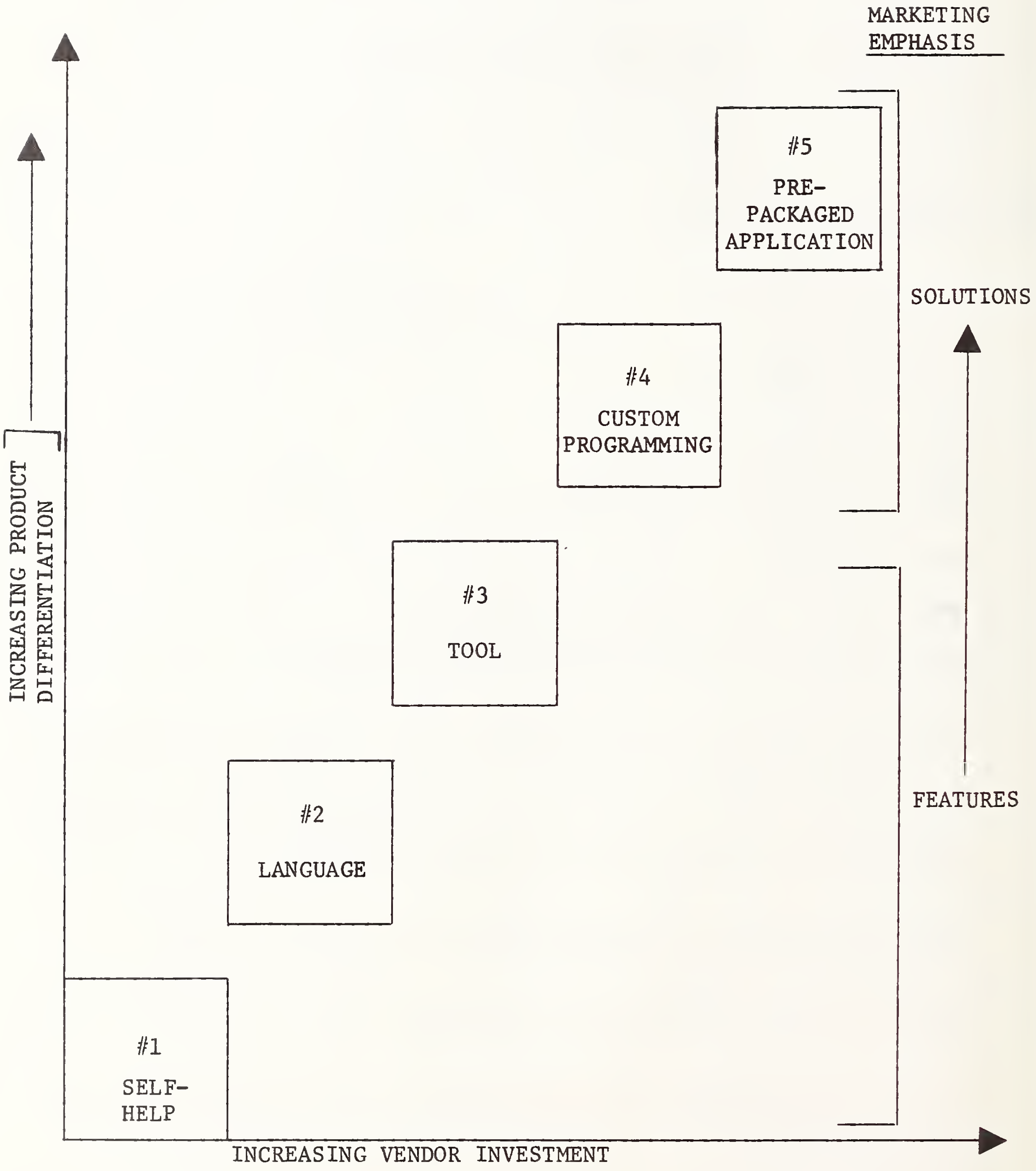


EXHIBIT VI-2

MARKET SEGMENT APPEAL OF EACH DBMSS PRODUCT STRATEGY

	PRODUCT STRATEGY	FEATURES → SOLUTIONS									
		#1		#2		#3		#4		#5	
MKT. SEG.		SELF-HELP		LANGUAGE		TOOL		CUSTOM PROGRAMMING		PRE-PACKAGED APPLICATION	
#	NAME	DP USER	NON DP USER	DP USER	NON DP USER	DP USER	NON DP USER	DP USER	NON DP USER	DP USER	NON DP USER
A	LARGE-SCALE SERVICE			MUCH		MUCH		SOME		MUCH	
B1	NON-TECHNICAL (PRODUCTION)				MUCH		MUCH		MUCH		SOME
B2	NON-TECHNICAL (ANALYTICAL)				MUCH		MUCH		MUCH		
C1	LARGE/DP OFF-SITE	SOME		MUCH		MUCH				SOME	
C2	LARGE/DP ON-SITE	SOME		MUCH		MUCH				SOME	
D1	TECHNICAL/SMALL					MUCH		SOME			
D2	NON-TECHNICAL/ SMALL							SOME	MUCH		
E	ON-DEMAND PROCESSING	MUCH									

- Advantages of this strategy include ease of market entry and low vendor investment.

- On the other hand, competition is widespread, and revenue potential is the lowest of the five strategies discussed.

- This strategy often originates in response to an existing customer's request for a DBMSS which the vendor does not have.

- Salesmen of vendors using this strategy usually have relatively little knowledge of DBMSS uses, or of its capabilities.

- Customer technical support is often limited.

- In general the vendor relies on the customer to discover his own solution, and then to find the vendor.

- Vendors usually rely on Third Party DBMSS when pursuing this strategy since much of the missionary marketing and technical training is assumed to be available elsewhere.

- This strategy's best appeal is to Market Segment E ("On Demand Processing" - Reference Section III.C.II above) since the customer must be DP trained and quite self-sufficient.

- This strategy also has a secondary appeal to some DP-trained people in the large companies of Segments CI ("Technical/Large DP Off-Site") and C2 (Technical/Large DP On-Site").

2. BASIC STRATEGY #2: SELLING AS A "LANGUAGE"

- Vendors adopting this strategy are focusing on customers who intend to do much development work themselves.

- Many vendors take a "Features" rather than a "Solution" selling approach. This is not desirable, but is due in most cases to lack of training and experience of the marketing force.

- Effective "Language" selling requires a significant amount of slaesman product knowledge as well as user technical support since the user must devote much front-end time to learning it.

- Many vendors with Third Party DBMSS adopt this strategy if they have salesmen and technicians who can understand and discuss the DBMSS language in comparison to COBOL, FORTRAN or assembly language.

- This strategy, when employed for the DP-trained prospect, appeals best to Market Segments A ("Large Scale Service"), C1 ("Technical/Large DP Off-Site"), and C2 ("Technical/Large DP On-Site").

- Some Proprietary DBMSS vendors are using this strategy when they have a system which appeals to non-DP trained users who are sufficiently sophisticated to use it for programming. Market segments B1 ("Non-Technical (Production)/Large DP In-House") and B2 ("Non-Technical (Analysis)/Large DP In-House"), are their primary focus.

- Adopting a new language is not a casual decision for most organizations. For this reason, this strategy involves a longer selling cycle, more salesmen, customer support, and user education resources than the "Tool" strategy outlined below.

3. BASIC STRATEGY #3: SELLING AS A "TOOL"

- When a vendor sells his DBMSS as a tool, his basic appeal is how well the user can do his inquiries and analysis once the system is built, rather than how effectively program development can be accomplished.

- Currently most Third Party vendors who adopt this strategy are emphasizing "Features" rather than "Solutions" and are marketing to DP-trained users.

- In contrast, Proprietary vendors are selling to non-DP oriented people and are stressing "Solutions".

- To successfully sell DBMSS as a "Tool" requires the vendor's salesmen and technical personnel to have a good understanding of the uses of the DBMSS. They must be trained to recognize which of the prospect's needs are best suited to the DBMSS capabilities and which are not.

- The Market Segments most attracted to this strategy are the same ones to which the DBMSS "Language" strategy appeals, namely A ("Large Scale Service"), C1 ("Technical/Large DP Off-Site) and C2 ("Technical/Large DP On-Site"), for systems appealing to the DP-trained user, and B1 ("Non-Technical (Production)/Large DP In-House") and B2 ("Non-Technical (Analytical)/Large DP In-House") for the non-DP trained prospect.

- This strategy requires more vendor personnel product knowledge, and applications knowledge, as well as a significant amount of technical training resources, than either the "Self-Help" or "Language" strategies.

4. BASIC STRATEGY #4: SELLING "CUSTOM PROGRAMMING"

- Vendors following this strategy use DBMSS primarily as a means of competing more effectively in the custom programming and processing marketplace.

- Vendors use the DBMSS to develop applications faster and/or less expensively than their competitiors who use conventional programming languages.

- Customers typically have little concern or awareness of the DBMSS used to build their application.

- Both Third Party and Proprietary DBMSS vendors sell "Solutions" rather than "Features" when using their strategy.

- Vendors successful with this strategy have good sized internal staffs that are well-trained in application development using the vendors' DBMSS.

- Sales personnel must be carefully trained to recognize good and bad proposed DBMSS applications. They do not, however, need to have the degree of product knowledge required of salesmen implementing the "Language" or "Tool" strategies previously descussed.

- This strategy has more "Value Added" by the vendor than any of the three strategies so far. By using this strategy, the vendor is able to obtain both development and processing revenue from the same technology.

- In addition, this strategy gives an easy entry into the highest level strategy, Pre-Packaged Applications.

- The Custom Programming strategy appeals to the non-DP oriented users in Market Segments B1 ("Non-Technical (Production)/Large DP In-House"), B2 ("Non-Technical (Analytical)/Large DP In-House"), and D2 ("Non-Technical/Small Without On-Site DP").

- This strategy also has appeal to DP-trained users in Segment A ("Large Scale Service" and D1 ("Technical/Small DP On-Site").

5. BASIC STRATEGY #5: SELLING "PRE-PACKAGED APPLICATIONS"

- This is the strategy which has the most value added, the greatest product differentiation, the biggest market revenue growth potential and the fewest DBMSS competitors.

- Vendors using this strategy use their data base management system to develop generalized application programs which are then implemented for individual customers with some degree of modification.

- An example of this approach is Tymshare's MAGNUM/OPUS which is a prewritten manufacturing control system.

- When using this strategy, the vendor leverages the DBMSS knowledge of his people such that he not only obtains processing revenues for his system, but also has the opportunity to recover more than his actual development costs since he is selling the same basic code many times over.

- This strategy requires the biggest vendor investment of the five strategies discussed, and also requires the greatest skill in ascertaining market needs.

- This strategy is the most demanding of the vendor in terms of "Solution" selling. sales and customer support people must know a great deal about the customer's problem. The vendor using this strategy is often in direct competition with software products vendors.

- The vendor must be effective at providing maintenance services. This is an especially tricky undertaking since most customers will have a slightly customized version of the vendor's basic product. Careful control over the amount of customization that will be supported is critical to success.

- The Pre-Packaged Application strategy appeals the most to Market Segments A ("Large Scale Service"), B1 ("Non-Technical (Production)/Large DP In-House"), C1 ("Technical/Large DP Off-Site"), and C2 ("Technical/Large DP On-Site"). Large companies with a broad base of DP experience make up the bulk of these segments. They have firsthand knowledge of the difficulty of application development work, and are familiar with the advantages of using generalized applications programs.

B. MARKET POTENTIAL BY PRODUCT STRATEGY

1. OVERALL TRENDS

- Product Strategies with the greatest Product Differentiation and Value Added (i.e. "Tool", "Custom Programming", and "Pre-Packaged Applications"), will enjoy the greatest market growth. As shown in Exhibit VI-3, those Product Strategies which are Solution rather than Features oriented will increase from $115 million in 1976 (55% of the market) to $727 million (75% of the market) by 1981.

- Factors affecting these growth characteristics include:

EXHIBIT VI-3

DBMSS MARKET GROWTH BY PRODUCT STRATEGY GROUP: 1976-1981

PRODUCT STRATEGY GROUP	PRODUCT STRATEGIES INCLUDED	REVENUES ($ MILLION)		% OF TOTAL ANNUAL REVENUES	
		1976	1981	1976	1981
SOLUTION	#5: PRE-PACKAGED APPLICATIONS #4: CUSTOM PROGRAMMING #3: TOOL	115	727	55%	75%
FEATURE	#2: LANGUAGE #1: SELF-HELP	95	243	45%	25%
	TOTAL	210	970	100%	100%

  - The market predominance of Non-Technical Users (B1 and B2). They will be 55% of all buyers by 1981. They focus on results rather than the details of a technology they cannot and do not desire to understand.
  - The small but enthusiastic receptivity of the market to Pre-Packaged Applications to date. This encourages vendors to invest further in the development of such systems.
  - The desire of users to get a need application implemented as quickly as possible.
  - The competitiveness of the marketplace which requires much product differentiation in order to survive.

- Exhibit VI-4 and 5 indicate the forecasted levels and market shares for each of the five major Product Strategies.

2. "TOOL" GROWTH

- Selling DBMSS primarily as a "tool" is currently the dominant strategy with an estimated $84 million in revenues, and a 40% market share. It will continue to lead all others through 1981 when it will account for 45% of all sales, and account for $437 million in revenues (a fivefold increase from 1976).

3. "LANGUAGE" GROWTH

- The "Language" strategy will grow less than the "Tool" approach primarily because it does not appeal to as broad a market.

- DBMSS can be sold relatively easily as a language to Non-Technical Users (e.g. Segments B1 and B2). However, it is a much more difficult task to sell it to technically experienced prospects (e.g. Segments C1 and C2) who generally prefer industry standarized languages such as COBOL and FORTRAN.

EXHIBIT VI-4

DBMSS MARKET GROWTH BY PRODUCT STRATEGY: 1976-1981

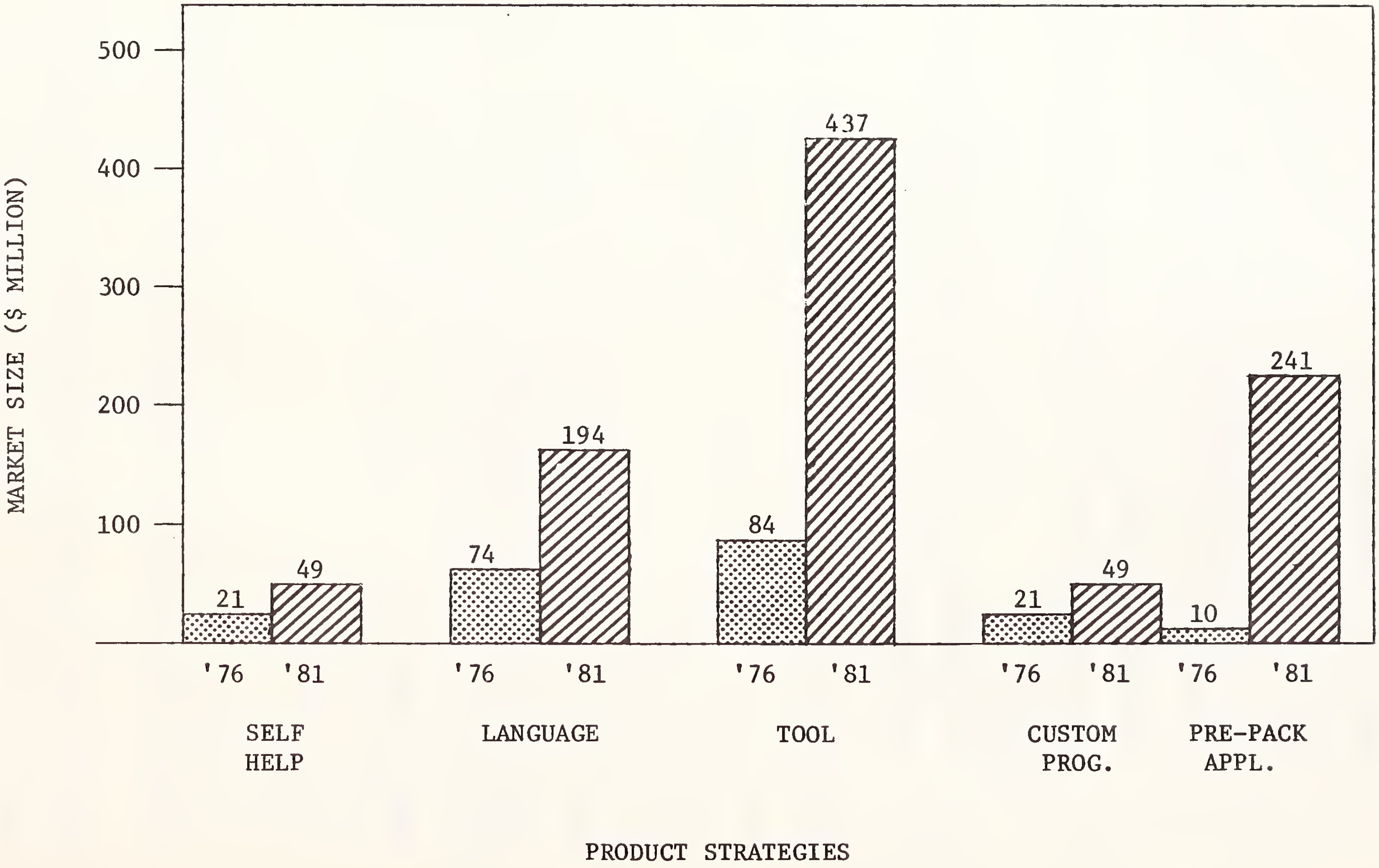
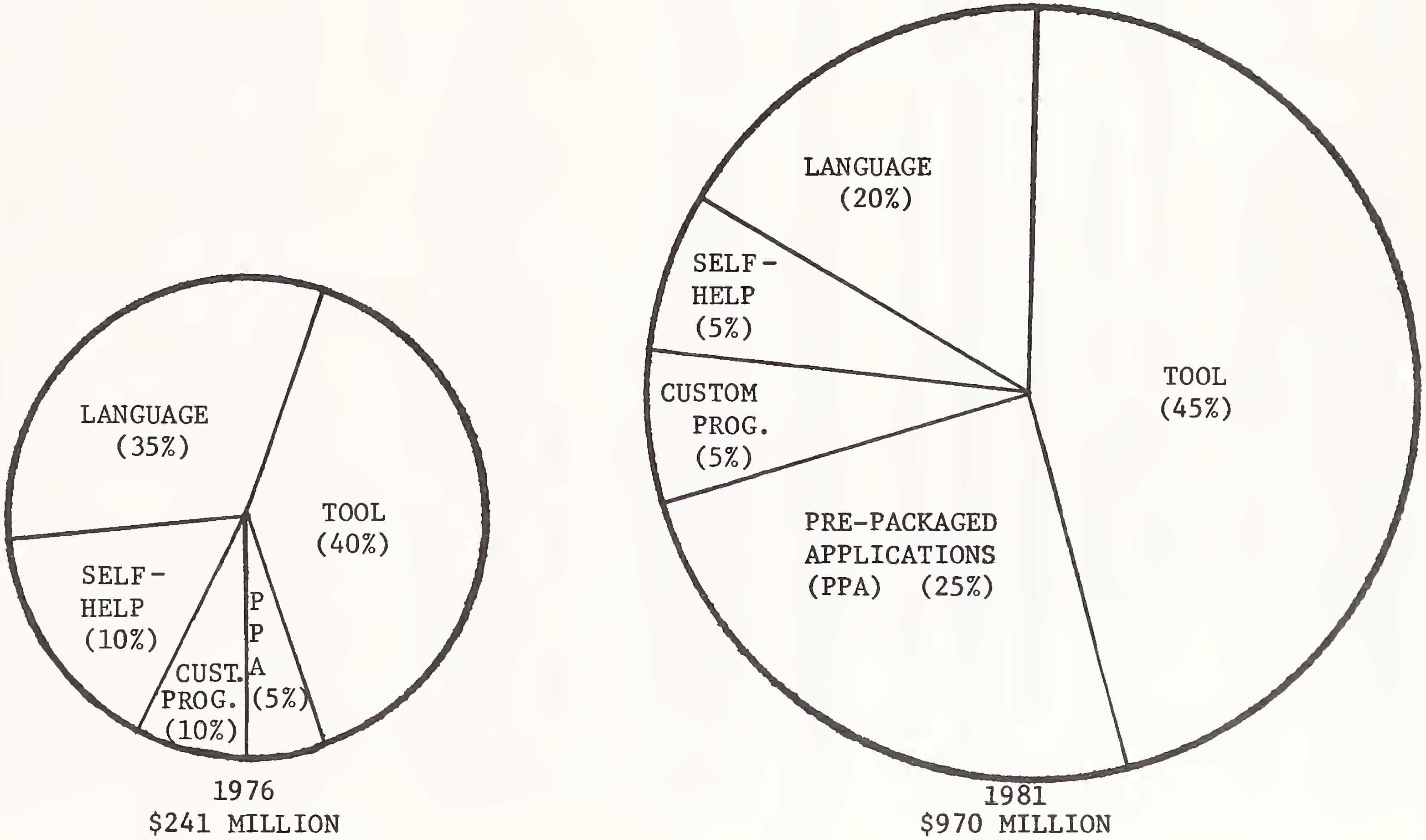


EXHIBIT VI-5

DBMSS MARKET SHARE BY PRODUCT STRATEGY: 1976-1981



4. "PRE-PACKAGED APPLICATIONS" GROWTH

- Pre-Packaged Applications will soar from the least used Product Strategy in 1976 ($10 million in sales, a 5% market share), to the second most active by 1981 with $241 milion in revenues, 25% of the entire DBMSS market.

- Pre-Packaged Applications growth will be due to the rapid implementation capability (which has been a key consideration for almost all RCS customers for many years), the reduction of risk for the customer (due to the almost complete elimination of programming variables), and the removal from the customer's concern of the details of technical design and construction.

5. "CUSTOM PROGRAMMING" AND "SELF-HELP" GROWTH

- The two Product Strategies which will result in the slowest growth are "Self-Help" and "Custom Programming".

- "Self-Help" will grow slowly because a majority of the DBMSS prospects want more than simply a data base management system installed on a vendor's computer with little customer support behind it.

- Custom Programming will grow slowly, not so much due to a lack of demand, but because DBMSS vendors are less enthusiastic about pursuing this strategy. Custom Programming services are the most labor intensive of all the DBMSS strategies analyzed. Talent is hard to acquire and requires extensive and expensive training. As a result, profit margins are smaller. In addition, the market segment most interested in Custom Programming (D1 and D2) are the smaller companies whose DBMSS revenues typically average much less per customer than other segments.

- Many DBMSS vendors undertake the parogramming, for the customer's first application, if necessary, but work hard to get the customer sufficiently trained so that it can undertake program development for subsequent systems rather than rely on the vendor's staff.

C. IMPACT OF MINI-COMPUTERS

- Mini-computer vendors are marketing data base management systems very aggressively. This respresents a significant competitive challenge to DBMSS vendors.

- Exhibit VI-6 lists many of the most popular data base management systems offered on mini-computers. Although DEC hardware is the most popular for these systems, there are a wide variety of mini-computers which have them available.

- To date, most mini-computer-based data base management systems users have been small companies with $35 million or less in sales. This has not been the DBMSS vendors' main market.

- Nevertheless as distributed processing applications become more prevalent in larger organizations, the mini-computer will threaten more and more of the DBMSS vendors' large customers.

- The mini-computer data base management systems have important positive ramifications also for DBMSS vendors. Mini-computer vendors are doing an excellent job of educating the market in a way that the DBMSS vendors could never afford to do. As a result overall demand is being stimulated by the mini-computer vendors' data base management systems emphasis.

EXHIBIT VI-6

MINI-COMPUTER BASED
DATA BASE MANAGEMENT SYSTEMS

NAME	MINI-COMPUTER	VENDOR
ADMINS/11	PDP/11	ADMINS, INC.
DBMS-10	DEC SYSTEM-10	DIGITAL EQUIPMENT CORPORATION*
DBMS-11	PDP/11	DIGITAL EQUIPMENT CORPORATION**
IMAGE/3000	HP/3000	HEWLETT-PACKARD
IMAGE/2000	HP/2000	HEWLETT-PACKARD
IMAGE/1000	21 MX	HEWLETT-PACKARD
INFOS	ECLIPSE C/300	DATA GENERAL
PRODUCT/3	INTERDATA MODCOMP PDP/11	ELS SYSTEMS ENGINEERING
REALITY	MICRODATA MODEL 160	MICRODATA
RMS-11	PDP 11/70	DIGITAL EQUIPMENT CORPORATION
TOTAL	PDP/11 VARIAN V70	CINCOM SYSTEMS

*DEVELOPED BY RAPIDATA

**DEVELOPED BY CULLINANE CORPORATION

- Several DBMSS vendors are seriously examining ways by which they can offer their own DBMSS on a mini-computer, install it on the customer site and then allow it to communicate when necessary to their central computers.

- This strategy is designed to strengthen the DBMSS vendor's competitive ability on new accounts as well as to protect large existing customers from going completely in-house.

D. TECHNOLOGY DIRECTIONS OF DATA BASE PROCESSING

- Effective and efficient data base processing will be the dominant capability of the next generation of hardware.

- "Ease of use", being the most desired single feature, the Relational data base approach is likely to become the most popular in the future.

- In addition to "ease of use", the major thrust of future data base management systems will be "more device independence" and "distributed data processing" capabilities.

- Existing data base management systems will continue to evolve and will feature upgrades which expand the system outside the limits of any one particular data structure. Many of the current systems will focus on addition of Relational capabilities.

E. PROPRIETARY VERSUS THIRD PARTY DBMSS

- The vendor's decision concerning whether to market a Proprietary or Third Party DBMSS is an extremely critical one.

- Each type of DBMSS appeals to distinctly different market segments, involving different types of competitors, and imposes different resource and investment requirements upon the vendor.

- The market characteristics, advantages and disadvantages of each type of DBMSS is discussed below.

1. PROPRIETARY DBMSS CONSIDERATIONS

- Proprietary DBMSS have the following market characteristics:

  - They are much more Non-Technical User oriented than Third Party systems.
  - They are used more frequently for Analytical than Production applications (60% of the users surveyed).
  - They are sold more frequently to users with in-house DP (73% of the Proprietary users surveyed had internal DP versus 56% for Third Party DBMSS customers).

- Advantages of Proprietary DBMSS to an RCS vendor include:

  - It is a more differentiated product, as the vendor is the only source of the DBMSS.

- Once sold, the customer is less likely to go in-house since it requires a significant conversion effort to another data base management system.
- The vendor is able to maintain better product design and enchancement control thus helping to assure the product evolves toward those markets he wants to serve.
- There is confirmed market interest since Proprietary DBMSS have already achieved significant market penetration.
- They have primary appeal to the four fastest growing segments in the market, namely (in order of importance):

  B2: Non-Techincal User/Analytical

  B1: Non-Technical User/Production

  D2: Small Companies/Non-Technical Users

  D1: Small Companies/Technical Users

  (In 1976, these four segments comprised 44% of the market. By 1981, they will account for 70% of all revenues.)

- The vendor has the option to also market the DBMSS as a software product, thus eliminating one of the Third Party DBMSS major advantages (i.e. portability).

- Disadvantages of Proprietary DBMSS include:

  - A requirement for more investment in marketing. Third Party systems are heavily promoted by hardware vendors and have gained much attention within the DP community. Proprietary DBMSS, in contrast, are relatively unknown unless the DBMSS vendor itself initiates promotional activities.

- Vendor support personnel must be trained by the vendor since there is no external source.
- Larger and more aggressive competitors must be faced.
- If the vendor does not want to develop a Proprietary DBMSS, it is difficult (but not impossible) to find a suitable external candiate.
- If the vendor wishes to build its own Proprietary DBMSS, it must make a large investment over a long period of time (several million dollars over 2 or more years).

2. THIRD PARTY DBMSS CONSIDERATIONS

- Market characteristics of Third Party DBMSS include:

  - Sold mostly to Technical Users.
  - Used most frequently for Production applications (71% of the users surveyed, versus 29% for Analytical applications).
  - Primarily appeal to the following market segments (listed in order of importance):

    C1: Technical User/Off-Site DP
    C2: Technical User/On-Site DP
    A: Large Scale Service
    E: On-Demand Processing

  - Together these four segments comprised 56% of market revenues in 1976 and will account for 30% of 1981 sales.

- Advantages of marketing Third Party DBMSS include:

- Faster market entry since little or no product development time is required.
- Wider selection of data base management systems to market.
- Availability of a pre-conditioned market if data base management system chosen already has a large customer base.
- More easily sold to prospects not currently customers of the vendor since its portability helps reduce risk in the prospect's eyes.
- Greater availability of pre-trained personnel for customer support duties.
- Fewer resources required for enhancements since the data base management system developer usually undertakes this responsibility.
- Less investment required for programming services since users often are trained, or desire to be trained, to do their own programming.

- The disadvantages of marketing a Third Party DBMSS include:
  - Less product differentiation.
  - Easier for customer to convert to another source.
  - Increased risk that the developer may not enhance the product for the markets vendor wishes to pursue.
  - Appeals to market segments which, although growing in revenue potential, are declining in market share.
  - Inability to obtain exclusive marketing rights, thereby compounding the difficulty of marketing the service by making product differentiation even harder.

F. SPECIAL CONSIDERATIONS

1. BENEFITS TO OFFER

- DBMSS vendors must appeal to specific market segments with one or more of the following benefits:
  - For Application Development:
    - Ease of Use (for non-DP trained users)
    - Speed of Development (for DP or non-DP trained users)
    - Power and Flexibility
    - Reduced Cost
    - Machine Resource Availability
  - For Inquiry and Analysis:
    - Ease of Use (for non-DP trained users)
    - Speed of Use (for DP trained users)
    - Power and Flexibility
    - Reduced Cost
  - For Maintenance:
    - Ease of Use (non-DP trained users)
    - Speed of Use (DP trained users)
    - Reduced Cost

2. VENDOR RESOURCES

- DBMSS requires more marketing and support than most other RCS products. It is an extremely people intensive business.

- Different market segments require different vendor strategies and resources. Vendors must therefore very carefully match their internal strengths, resources and goals against the opportunities and requirements of specific market segments.

- Since revenues for a new customer build up slowly, vendors must have sufficient financial resources to fund heavy front end expenses required to get the new customer established.

3. CUSTOMER SUPPORT AND TRAINING

- Because a vast majority of new DBMSS customers do not have prior training on the data base management system itself, vendors must invest heavily in customer support, training and documentation.

- Customer support requirements for all market segments are substantial. Depending upon the market segment selected and the product strategy pursued, vendors must offer one or more of the following support services:

  - User training
  - Programming
  - Applications Systems Design
  - Data Base Design
  - Data Base Maintenance
  - Basic DP Concepts Training

- Vendor support personnel must be expert in designing systems with the DBMSS being marketed. Improperly designed applications can easily create user and processing inefficiencies which are completely unacceptable to the customer.

- Vendors generally must be prepared to program the first DBMSS application for a customer, and often the second and third.

- The availability to a customer of local vendor support is an important competitive advantage.

- The development of a large reservoir of DBMSS support talent is difficult, costly and time consuming task due to the scarcity of qualified personnel.

4. SALES AND MARKETING

- Salespeople must be trained to recognize applications which are appropriate to the DBMSS being sold.

- Salespeople must also be trained to sell the results of the desired application, not features and functions of the DBMSS itself.

- The capabilities of the DBMSS to be marketed must be carefully matched to the requirements of the market segment being pursued. For example, Segment B2 users (Non-Technical/Analytical applications) require a DBMSS which can give quick and efficient response to random and often complex on-line inquiries. Segment B1 (Non-Technical/Production applications) users require a DBMSS which can handle large transaction volumes.

- The Pre-Packaged Applications Product Strategy should only be attempted by the most experienced DBMSS vendors. Success with this strategy requires an excellent understanding of the marketplace, investment of significant programming and maintenance resources, and much application oriented training of the sales force.

- Organizations which can especially benefit from DBMSS include:

  - National companies with no national networks.
  - Subsidiaries with little or no in-house DP and which operate in businesses different than the parent company.
  - Headquarters of large conglomerates which have little DP on-site.

- For Third Party vendors, the most competitive market is C1: Technical User/Off-Site DP.

- For Proprietary DBMSS sellers, the most competitive market is B2: Non-Technical User (Production).

APPENDIX A: VENDOR/ PRODUCT PROFILES

APPENDIX A: VENDOR/PRODUCT PROFILES

I. ADP NETWORK SERVICES, INC.

- ADP acquired The Cyphernetics Corporation in 1975, thus gaining a direct entry into DBMSS. Total ADP revenues for 1976 for computer services were $188,000,000, while RCS sales were $28,000,000. DBMSS revenues are currently in excess of $5,000,000 annually.

- IPL (Information Processing Language) was developed by National Information Systems and has been marketed by ADP since 1975. It is designed especially for fast implementation of Production systems and emphasizes ease of use by non-DP trained personnel. It has its own self-contained language, or can be interfaced to COBOL or FORTRAN. Currently in use at over 300 sites, it is processed by ADP on a DEC System-10 and is available in both RJE and interactive modes. ADP primarily uses IPL as a language for custom programming development for external customers.

- ADP also offers System 1022 on its RCS network. It is best used for ad hoc inquiry on static data bases.

2. BOEING COMPUTER SERVICES

- BCS had 1976 non-captive computer services revenues of $55,000,000 of which approximately $20,000,000 were derived from RCS. DBMSS sales are less than $1,000,000.

- BCS provides IDMS, INQUIRE, and System 2000 as DBMSS. INQUIRE has been offered since 1974, while IDMS and System 2000 were marketed on a formal basis beginning in 1976. System 2000 is processed on BCS Control Data hardware in Seattle, while IDMS and INQUIRE are installed on IBM 370 in McLean, Virginia.

3. COMPUTER SCIENCES CORPORATION

- CSC is one of the largest computer services firms with $234 million in sales in 1976. It is also one of the largest Remote Computing Service firms with $52,000,000 in revenues, and is one of the largest DBMSS vendors with more than $10,000,000 in annual sales.

- ALADIN was developed by CSC and introduced to the market in 1975. ALADIN/REPORT II, which is a more powerful report writer, was released in 1976. ALADIN is used mostly for Production systems and is offered as a part of CSC's Infonet remote computing service. ALADIN has its own self-contained language. It also permits interfaces to COBOL, FORTRAN and assembly language.

- System 2000 is also offered as a DBMSS by CSC. It was first marketed by them in 1974.

4. COMPUTER NETWORK CORPORATION (COMNET)

- COMNET is a small firm with total computer services revenues of $6,900,000 in 1976, all of which were RCS sales. DBMSS contributed under $1,000,000 in 1976. Management considers DBMSS to be an important part of their strategy.

- COMNET offers INQUIRE, Model 204 amd System 2000 as DBMSS. Model 204 was introduced in 1974 while the other two systems have been marketed as DBMSS since 1971. Most of the company's business is with the Federal Government.

5. COMSHARE

- Comshare is a medium sized RCS vendor with 1976 revenues of $13,800,000. The company is classified by INPUT as a DBMSS Specialist since more than 30% of its RCS revenues come from DBMSS (over $4,000,000).

- COMPOSIT '77 is one of the first Proprietary DBMSS marketed. Introduced in 1971, it is still actively marketed, although COMSHARE will be soon releasing a Relational system called QUESTOR to replace it. The company also uses COMPOSIT '77 to develop Pre-Packaged Applications, with emphasis on personnel systems. PRO/FILES, a human resource management system, is an example of such a system.

6. DATANETWORK

- Datanetwork is Honeywell's computer services group. In constrast to many other hardware vendors, computer services are marketed by the same salesman who sells computers. The objective is to get the hardware sold first, and services secondarily.

- Datanetwork offers I-D-S/II and MDQS (Management Data Query System) as DBMSS. Both systems were introduced in 1975. MDQS can be used with I-D-S/II, or can function as a standalone system.

7. GENERAL ELECTRIC - INFORMATION SERVICES

- GE-IS is a $100 million computer services division of GE which obtains 90% of its revenues from RCS. GE-IS is also one of the country's largest DBMSS vendors with over $10 million in sales.

- DMS was developed by GE and released in 1974. An upgraded version, DMS II, was introduced in March, 1977. DMS is a reporting and retrieval DBMSS that has its own self-contained language as well as provision for interfacing with FORTRAN. It has a hierarchical data structure and is processed on Honeywell 6088 computers. GE stresses its ease of use by non-DP trained personnel, worldwide accessibility via the Mark III network and ability to incorporate French or German statements. DMS competes most often with the Proprietary DBMSS of Tymshare (MAGNUM), National CSS (NOMAD) and Computer Sciences (ALADIN).

8. INTERACTIVE DATA CORPORATION

- IDC is a wholly owned subsidiary of Chase Manhatten Bank. With total computer services revenues of $15,600,000 in 1976, IDC obtains several million dollars annually from DBMSS, and specializes in services to financial institutions.

- XDMS is IDC's main DBMSS. It is a Production oriented system which is available via RJE or interactively. It was introduced in 1975 and is used at over 200 customer sites. It uses a self-contained language, can be used by non-DP trained personnel and is processsed on an IBM 370.

- XSIM is a DBMSS designed especially to be an efficient processor of time-series data. It was introduced to the market in 1971.

9. MARTIN-MARIETTA DATA SYSTEMS

- MMDS received $24,750,000 in non-captive computer services revenues in 1976. Approximately $6,000,000 were from RCS sales in the U.S. DBMSS sales are less than $1,000,000.

- MMDS offers IMS as a DBMSS on a low profile basis. The service was first introduced in 1973. Users are usually customers of other MMDS services.

10. MC DONNEL DOUGLAS AUTOMATION (MCAUTO)

- MCAUTO is a large computer services vendor with $77,000,000 in external revenues in 1976, of which $34,000,000 was from RCS. DBMSS revenues are in excess of $5,000,000 annually.

- MCAUTO is the nation's largest DBMSS vendor of IMS services. Having offered the service since 1972, MCAUTO specializes in on-line IMS Services to a relatively small number of customers (less than 50). Fewer than 10 customers generate a majority of MCAUTO's DBMSS revenues. The company's IMS services include data base design consulting, programming and processing. MCAUTO has also developed several Pre-Packaged Applications based on IMS which are aggressively marketed.

11. NATIONAL CSS

- National CSS is a large computer services company with 1976 sales of $35,600,000, of which 91% is from RCS. The company has been marketing DBMSS since 1969 when it introduced RAMIS, a Third Party DBMSS developed by Mathematica. National CSS is one of the largest DBMSS vendors with more than $5,000,000 in annual revenue.

- NOMAD is a Relational DBMSS developed by National CSS and introduced in mid-1975. It is characterized as very flexible and especially good for ad hoc inquiry. It is used most often for Analytical applications, and features a self-contained language. It is processed on an IBM 370.

12. ON-LINE SYSTEMS (OLS)

- OLS is primarily a Remote Computing Services firm with 90% of its $11,900,000 in 1976 revenues coming from that source. DBMSS sales are in excess of $3,000,000. Because the company has over 30% of its revenues derived from DBMSS it is classified as a DBMSS Specialist.

- OLIVER was one of the first Proprietary DBMSS introduced to the market, having been released in 1970. It is a transaction (Production) oriented system and is capable of handling a variety of data structures and is offered in both RJE and interactive modes. Over 200 companies use the system which is processed on a DEC System-10.

- SHURE is a Pre-Packaged Application, based on OLIVER, which performs personnel management functions. PURE is also a Pre-Packaged Application which uses OLIVER as a foundation, and provides purchasing and receiving capabilities to clients.

13. OPTIMUM SYSTEMS, INC.

- OSI reported computer services revenues of $38,000,000 in 1976, of which $9,800,000 were from RCS. DBMSS revenues are in excess of $2,000,000 annually.

- OSI specializes in IMS as a DBMSS, and focuses on medium to large companies as well as local governments. OSI takes a turnkey approach involving design, programming and processing. OSI has also developed a Pre-Packaged Application called the General Municiple Information System. This package provides basic accounting and financial processing capabilities to city governments.

14. PLANNING RESEARCH CORPORATION (PRC)

- PRC had sales of $148,000,000 for 1976. DBMSS sales are less than $1,000,000.

- PRC provides ADABAS as a DBMSS primarily on the East and West Coasts. The system is offered via RJE or interactively, and is used primarily for Production oriented applications.

15. RAPIDATA

- Rapidata reported $15,600,000 in RCS revenues in 1976. DBMSS revenues are in excess of $1,000,000 annually.

- DBMS-10 is a Rapidata developed, generalized, data base management system for sequential, tree-base structured, hierarchical and network data bases. It operates as an extension of COBOL and FORTRAN. Introduced in 1974, it runs on DEC System-10 and is offered as a DBMSS by Rapidata and as a software product by Digital Equipment Corporation.

- X2C, PROBE and FISCAL are DBMS-10 based languages also offered by Rapidata. PROBE is a time-series analysis language and FISCAL is a language primarily for financial, budgeting and reporting. FISCAL was introduced in 1976, while X2C, which is a query language, was released in 1975.

16. SERVICE BUREAU COMPANY (SBC)

- SBC, which was created by IBM in 1957, is now owned by Control Data Corporation. Computer services revenues for 1976 were $106,000,000 of which $61,000,000 were from RCS. DBMSS revenues are in excess of $10,000,000.

- MINI-MIS was introduced to the market in 1969. It is best suited for Analytical processing by non-DP trained users with relatively small (average = 1 million bytes) data bases. SBC uses MINI-MIS as a building block to construct a variety of applications. The company has extensively trained their people throughout the country in MINI-MIS, a strategy which has paid off in significant revenue return.

17. SYSTEMS DIMENSIONS LIMITED (SDL)

- SDL, which is based in Ottawa, Canada, had $21,000,000 in revenues from computer services in 1976 in Canada and the U.S. DBMSS revenues are in excess of $1,000,000 per year.

- SDL offers IDMS, IMS, System 2000 and RAMIS as DBMSS. IMS was initially marketed in 1973, RAMIS was introduced in 1974, while IDMS and System 2000 were offered beginning in 1975. Primary appeal is to DP knowledgeable people and organizations. A good deal of SDL's DBMSS business is with the Canadian government.

18. TYMSHARE

- Tymshare is one of the largest Remote Computing Service companies in the country. Computer services sales in 1976 were $81,000,000 of which approximately $54,000,000 were RCS revenues. Tymshare is also one of the largest DBMSS vendors with over $5,000,000 in annual revenues from this source.

- MAGNUM is a powerful Production (transaction) oriented DBMSS which is particularly well suited to large volume processing with on-line inquiry. It was developed by Tymshare, runs on a DEC System-10 and features Relational data structures and a self-contained language. Introduced in mid-1975, it currently has over 150 users and has become one of Tymshare's most successful new products. Tymshare has also introduced a Pre-Packaged Application based on MAGNUM. It is a manufacturing inventory management system called MAGNUM/OPUS.

- FOCUS is designed primarily for Analysis rather than Production processing. It is best used for on-line inquiry with large data bases and ad hoc reports. Introduced in 1976 by Tymshare, it was developed by Information Builders, New York City, a group of individuals formerly associated with Mathematica's RAMIS. It runs on IBM System/370 equipment.

- EXPRESS was designed specifically for marketing managers and analysts and is described as a cross-breed between a data base management system and a time-series analysis program. It has data base maintenance as well as display facilities, operates interactively and is processed on an IBM 370. The system was developed by Management Decision Systems, Boston, and brought to the marketplace by Tymshare in 1974.

- Tymshare concentrates primarily on their Proprietary DBMSS. However, they have offered System 2000, System 1022 and INQUIRE services for a number of years, mainly for those with in-house data base management systems who are seeking overflow processing services.

19. UNIVERSITY COMPUTING COMPANY (UCC)

- UCC is a large computer services firm with $67,000,000 in annual worldwide revenues in 1976, of which $18,000,000 were from RCS. DBMSS revenues are less than $1,000,000.

- Developed by UCC, dbIV was first released in 1975. It is a Relational system available in RJE but not interactively. It is processed on a Univac 1108 system and was designed primarily for DP-trained personnel. Self-contained as well as COBOL and FORTRAN languages can be used.

APPENDIX B: SURVEY QUESTIONNAIRES

USER'S QUESTIONNAIRE

INPUT QUESTIONNAIRE

DATE________________

USER __ VENDOR __ MAIL __ PHONE __ PERSON __

STUDY TITLE: COMPUTER SERVICES MARKETS FOR DATA BASE MANAGEMENT SYSTEMS

INPUT STAFF________________________________

PERSON INTERVIEWED________________________________

TITLE________________________ PHONE (   ) ________

COMPANY NAME________________________ PHONE (   ) ________

HEADQUARTERS ADDRESS (STREET)________________________

CITY________________ STATE____________ ZIP________

1. Do you have computer hardware (or terminals) in-house at this location?

No ___ (Go to #3)
Yes ___ Specify Below

Quantity	Manufacturer	Model

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USER'S QUESTIONNAIRE (Con't.)

2. Do you have any data base management systems (DBMS) installed in-house?

No ___ (Go to #3)
Yes ___ Specify Below

DBMS Name	Developer	CPU Used	Type	Applications

3. Do you currently use any data base management systems which are provided to you on a service basis by outside vendors?

Yes ___ (Go to #8)
No ___ Why not?

Under what conditions would you buy?

4. Do you plan to use any DBMS services during 1977?

Yes ___ (Go to #6)
No ___

5. Have you used any DBMS services in the past?

Yes ___ (Go to #6)
No ___ (End Interview)

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USER'S QUESTIONNAIRE (Con't.)

6. When will (did) you use DBMS services?

   For what applications?

   Why use DBMS services?

Go to #9

(Continued from #3)

8. a. What is your functional job involvement with DBMS services?

   a. What DBMS services do you currently use?

Name of Service	Vendor	Applications

(Fill out a "DBMS Service Profile" for each service listed in (8) above, beginning with the service which represents the greatest external monthly cost to the company, then go to #9 on page U7.)

USER'S DBMS SERVICES PROFILE

A. Name of DBMS service?

B. Vendor?

C. Service used for what applications?

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USER'S DBMS SERVICES PROFILE (Con't.)

D. 1. Date began using this DBMS service?

2. How frequently do you use this service?

Daily___ Monthly___ Weekly___ Other (Specify)______________

E. Importance of these applications to your company?

F. How is this service priced?

G. 1. What are the vendor's total charges to your company per month for this service?

2. Percent change estimated for twelve months from now? Why?

H. 1. How long into the future do you expect to use this service?

2. What factors will determine when you will stop using this service?

I. What alternatives were seriously considered in addition to the DBMS service you chose?

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USER'S DBMS SERVICES PROFILE (Con't.)

J. Why did the company decide to use---

1. This particular vendor?

2. This particular DBMS?

K. When you evaluate a DBMS service, how important to your final decision is each of the following?

Very	Some	Little	None	Service Considerations
				1. Ease of use by DP trained personnel.
				2. Ease of use by non-DP trained personnel.

L. What is your overall satisfaction with this DBMS service?

M. What do you---

1. Like best about this DBMS service?

2. Like least?

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USER'S DBMS SERVICES PROFILE (Con't.)

N. Was this DBMS service the first service you have used from this vendor?

Yes ____ No ____

If not, what other services were you using previously?

O. Have you begun using other services from this vendor since you started using his DBMS service?

Yes ____ No ____

P. Are you planning to put additional applications onto this DBMS Service?

Yes ____ What? Why? When?

No ____ Why not?

Q. All things considered, what do you feel are the keys to successful usage of this DBMS service?

(Go to Question #9, Page U7, if all DBMS Services Profiles have been completed.)

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USER'S DBMS SERVICES PROFILE (Con't.)

9. Rank the importance of each criteria below to your final decision to a DBMS service. (1 = highest)

___ DBMS features.
___ Vendor service reliability/availability.
___ Vendor technical support.
___ Vendor price.
___ Vendor experience with your application.
___ DBMS availability elsewhere.

10. What factors would cause you---

a. To significantly increase your usage of DBMS services?

b. To significantly decrease your usage of DBMS services?

11. What features, facilities or support do you feel are missing from currently available DBMS services that would make them more attractive to your company?

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USER'S DBMS SERVICES PROFILE (Con't.)

12. What new DBMS services would you like to see on the market?

13. What other observations or comments would you like to

(End Interview)

THANK YOU FOR YOUR TIME

VENDOR QUESTIONNAIRE

INPUT QUESTIONNAIRE

DATE________________

USER __ VENDOR __ MAIL __ PHONE __ PERSON __

STUDY TITLE: COMPUTER SERVICES MARKETS FOR DATA BASE MANAGEMENT SYSTEMS

INPUT STAFF____________________

PERSON INTERVIEWED____________________

TITLE____________________ PHONE ( )__________

COMPANY NAME____________________ PHONE ( )__________

HEADQUARTERS ADDRESS (STREET)____________________

CITY______________ STATE______________ ZIP__________

1. Do you offer data base management systems as a service?

No ___ (Go to #4)
Yes ___

2. What DBMS services does your company currently offer? (List in sequence by 1976 sales revenue, rank, beginning with the biggest seller.)

1976 Sales Rank	Forecasted 1977 Sales Rank	DBMS Service	DBMS Developer

(For each DBMS service listed in #2 above, fill in a "Supplier DBMS Service Profile", then go to #4.)

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VENDOR QUESTIONNAIRE (Con't.)

3. How important are DBMS services to your company's corporate goals for 1977?

   Why?

VENDOR DBMS SERVICE PROFILE

A. Overview of Service

1. Name of DBMS service?
2. Brief description of DBMS service (key features, languages, etc.).
3. Developer of DBMS?
4. If vendor is not DBMS developer, to what extent has vendor customized the DBMS?

   Much ____ Some ____ Little ____ None ____

5. Date first offered service?
6. Delivery method: Remote Batch ___ Interactive ___ Batch ___
7. Type DBMS data structure?
   Hierarchical ______
   Network (CODASYL) ______
   Relational ______
8. Resource or transaction priced?

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VENDOR DBMS SERVICE PROFILE (Con't.)

9. Geographic availability?

10. Number of customer sites currently using the service?

B. 1. Do you offer any related services?

Yes ___ No ___

If yes, what?

2. Do you also sell this DBMS as a software product?

Yes ___ No ___

If no, is it likely you might sometime in the future? Why or why not?

3. How do you market this service? (HQ/field resources, organization, emphasis, approach, etc.)

C. Customer Characteristics

Period	Company Size		Industry	
	Rank or %	Type	Rank or %	Type
Past 12 Months				

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VENDOR DBMS SERVICE PROFILE (Con't.)

C. Customer Characteristics (Con't.)

Period	In-House EDP		Applications		In-House DBMS	
	Rank or %	Type	Rank or %	Type	Rank or %	Type
Past 12 Months						

D. Do you pay a service royalty to the DBMS developer?

Yes ____ No ____ If Yes, how much?

E. What is the high, low and average monthly revenue of your customers?

F. How long does the typical customer continue using the service?

G. 1. What were your 1976 revenues from this service?

2. What percent growth over 1976 do you forecast for 1977 revenues?

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VENDOR DBMS SERVICE PROFILE (Con't.)

H. What annual revenues do you feel can be obtained (as a % of 1976 revenues)?

1. For 1978?

2. For 1979?

3. Why?

I. What do you consider unique about your DBMS service?

J. What is your competition for this service?

Name	Strengths	Weaknesses

K. What are the main reasons why---

1. Customers buy your service?

2. Do not buy your service?

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VENDOR DBMS SERVICE PROFILE (Con't.)

L. How many full-time people are assigned to this service?

No.	Duties

M. What are the main problems you face now in providing DBMS services?

In Marketing?

In Support?

Other?

Which problem listed above is the most significant problem? Why?

N. Other comments, observations.

(Go to #4 if all DBMS services have been profiled.)

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VENDOR QUESTIONNAIRE (Con't.)

4. How, in your opinion, do customers rank the following criteria when choosing DBMS services? (1 = highest)

____ DBMS Features
____ Vendor Service Reliability/Availability
____ Vendor Technical Support
____ Vendor Price
____ Vendor Experience with Their Application
____ DBMS Availability Elsewhere

5. What do you feel are the keys to being a successful DBMS services vendor?

6. Do you feel it is more advantageous (from a sales and profit point of view) to offer your own proprietary DBMS, or to use one developed by a third party?

Proprietary ____
Third Party ____
Why?

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VENDOR QUESTIONNAIRE (Con't.)

7. To what extent do you feel each of the following will impact the market for DBMS services over the next 3 years?

	Little or No Impact	Significant Positive Impact	Significant Negative Impact	Other (Specify)	Why?
a. Mini-computers					
b. Distributed Data Processing					
c. New Fourth Generation Hardware Introductions					
d. New DBMS Announcements					
e. Privacy/Security Needs					

8. What other developments and/or trends do you feel will significantly impact the DBMS services market during the next 3 years?

9. Which DBMS do you use for development of applications packages and packaged services which you sell?

10. What other comments or observations would you like to make?

THANK YOU VERY MUCH FOR YOUR TIME

MARKET OBSERVER QUESTIONNAIRE

INPUT QUESTIONNAIRE

DATE______________

INTERVIEWEE: Third Party Observer Mail __ Phone __ Person __

STUDY TITLE: COMPUTER SERVICES MARKETS FOR DATA BASE MANAGEMENT SYSTEMS

INPUT STAFF:______________________________

Person Interviewed______________________________

Title______________________________

Company______________________________

Address______________________________

Phone Number______________________________

Principal Business of Company______________________________

1. Interviewee's affiliation with report topic?

2. Does your organization use any DBMS in-house?

Yes ___ Which one(s)?
No ___

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Interview___________

MARKET OBSERVER QUESTIONNAIRE (Con't.)

3. Has your organization used DBMS services either currently or in the past?

   Yes ____ (Fill in User Questionnaire.)
   No ____

4. Are you familiar with any DBMS service offerings?

   Yes ____ Which ones?

   No ____

5. Do you know of any organizations which use DBMS services?

   No ____ (Go to #6.)
   Yes ____ (Fill in information below.)

Organization Name	Service Being Used	DBMS Applications	User Attitudes

6. Would you recommend that a potential DBMS user seriously consider a DBMS service?

   No ____ Why not?

   Yes ____ Why?

Date______________

Interview_________

MARKET OBSERVER QUESTIONNAIRE (Con't.)

7. What factors will most influence the rate of DBMS usage during the next 3 years?

8. What impact, if any, on DBMS usage acceptance and growth does the availability of DBMS services have?

9. What do you feel vendors could do to expand their market for DBMS services?

10. What will be the differences between DBMS three years from now and those of today?

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MARKET OBSERVER QUESTIONNAIRE (Con't.)

11. How might these differences impact the DBMS service market?

12. Other comments and observations?

THANK YOU FOR YOUR TIME